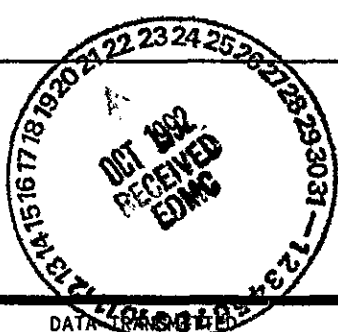
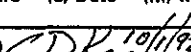
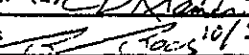
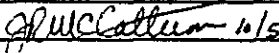

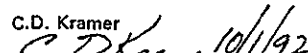




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1	1	Cog. Mgr. R.C. Roos		10/5/92	H4-55	C.D. Delaney			H4-56	3	
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18.		19.		20.		21. DOE APPROVAL (if required) Ltr. No.					
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7. Abstract

3/7/92 J. L. L.

The B-Pond system on the Hanford Site in south-central Washington State is undergoing a series of investigations designed to determine if hazardous or dangerous waste remains in the soils and/or sediments. The pond system has been classified as a Resource Conservation and Recovery Act of 1976 unit, and is undergoing closure under the act. This report summarizes the findings from three temporary boreholes constructed to sample soil beneath the 216-B-3A, 216-B-3B, and 216-B-3C Ponds. These field activities comprise Phase 3 investigations as described in 216-B-3 Pond System Closure/Postclosure Plan (DOE 1990). Samples from each borehole were analyzed for a wide variety of organic and inorganic constituents. Representative constituent concentrations indicate vadose zone soils are not contaminated with Resource Conservation and Recovery Act of 1976 regulated hazardous and/or dangerous waste.

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CONTENTS

1.0	INTRODUCTION	1
1.1	REGULATORY BACKGROUND	3
1.2	PHYSICAL AND HISTORICAL SETTING	4
2.0	DISCUSSION OF RECENT WASTE HISTORY	7
3.0	SAMPLING ACTIVITIES	9
3.1	OBJECTIVE AND SCOPE	9
3.2	ANALYTES INVESTIGATED	9
3.3	DESCRIPTION OF FIELD ACTIVITIES	15
3.3.1	The 3A Pond	15
3.3.2	The 3B Pond	16
3.3.3	The 3C Pond	17
4.0	SUMMARY OF RESULTS	19
4.1	ORGANIC CHEMICAL RESULTS	19
4.1.1	Pesticides/PCBs	21
4.1.2	Herbicides	24
4.1.3	Organophosphorous Pesticides	24
4.1.4	Dioxins and Furans	27
4.1.5	Volatile Organic Compounds	28
4.1.6	Base/Neutral/Acid Compounds	30
4.2	INORGANIC CHEMICAL RESULTS	33
4.3	RADIOANALYTICAL RESULTS	42
4.4	GEOLOGY AT THE VADOSE BOREHOLES	42
4.5	SOIL PHYSICAL PROPERTIES	43
5.0	DISCUSSION AND COMPARISON TO DANGEROUS WASTE CRITERIA	47
6.0	CONCLUSION	54
7.0	REFERENCES	55

APPENDICES

A	B-POND PHASE 3 SOIL DATA	A-i
B	ANALYTE VARIABILITY GRAPHS	B-i
C	ENVIRONMENTAL PROTECTION AGENCY OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE MEMORANDUM	C-i

93127610584

LIST OF FIGURES

1-1. The Hanford Site and the Study Borehole Locations	2
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LIST OF TABLES

3-1. Inorganic Parameters	10
3-2. Organic Parameters	11
3-3. B-Pond Phase 3 Borehole Sample Key	12
4-2. Pesticides/PCB Sample Result Summary -- 31 Regular Samples	22
4-3. Split Sample Results for Pesticides/PCBs	23
4-4a. Organophosphorous Pesticide Reporting -- 18 Regular Samples (Short List).	25
4-4b. Organophosphorous Pesticide Reporting -- 13 Regular Samples (Long List)	26
4-5. Internal Standard Percent-Recovery Summary Dioxins and Furans (25 Samples)	27
4-6. VOA Surrogate Percent-Recovery Summary (37 Samples--50 $\mu\text{g/Kg}$ Spikes)	28
4-7. Semivolatile Surrogate Percent-Recovery Summary (37 Primary Laboratory Samples)	31
4-8. Summary Statistics--Regular Samples ($\mu\text{g/g}$)	34
4-9. Field Duplicate and Split Comparison Summary	40
4-10. Physical Properties B-Pond Phase 3 Soil Samples	44
4-11. Grain Size Analysis	45
5-1. Evaluation of Inorganic Dangerous Waste Constituents in all Regular Samples	49

LIST OF TERMS

BNA	base/neutral/acid
CBEC	concentration-based exemption criteria
CDL	contractual detection limit
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	Code of Federal Regulations
CLP	contract laboratory program
CMS	corrective measures study
CRDL	contract-required detection limit
CRQL	contract-required quantitation limit
DOE	U.S. Department of Energy
DW	dangerous waste
Ecology	Washington State Department of Ecology
EHW	extremely hazardous waste
EII	Environmental Investigation Instruction
EPA	U.S. Environmental Protection Agency
FR	Federal Register
HSWA	<i>Hazardous and Solid Waste Amendments of 1984</i>
OSM	Office of Sample Management
PCB	polychlorinated biphenyls
PID	photoionization detector
PQL	practical quantitation limit
PUREX	Plutonium/Uranium Extraction (Plant)
QC	quality control
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
SOW	statement of work
SQL	sample quantitation limit
TIC	tentatively identified compound
Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
TSD	treatment, storage or disposal
VOA	volatile organic analysis
WAC	Washington Administrative Code
Westinghouse Hanford	Westinghouse Hanford Company

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1.0 INTRODUCTION

A number of waste management units located on the Hanford Site in south-central Washington State are being physically and/or procedurally closed in accordance with applicable laws, regulations, and agreements. One unit, the 216-B-3 Pond System (B-Pond), consists of one main pond area, three expansion ponds (often referred to as lobes) and the 216-B-3-3 Ditch. This series of ponds lies immediately east of the Hanford Site's 200 East Area (Figure 1-1). The B-Pond has been considered a *Resource Conservation and Recovery Act of 1976* (RCRA) treatment, storage, or disposal (TSD) unit (Ecology et al. 1989, p B-2) comprised of the following:

- Open section of the 216-B-3-3 Ditch, approximately 3,700 ft
- 216-B-3 Pond (main pond), approximately 35 acres
- 216-B-3A Pond (hereafter referred to as the 3A Pond), approximately 11 acres
- 216-B-3B Pond (hereafter referred to as the 3B Pond), approximately 11 acres
- 216-B-3C Pond (hereafter referred to as the 3C Pond), approximately 41 acres.

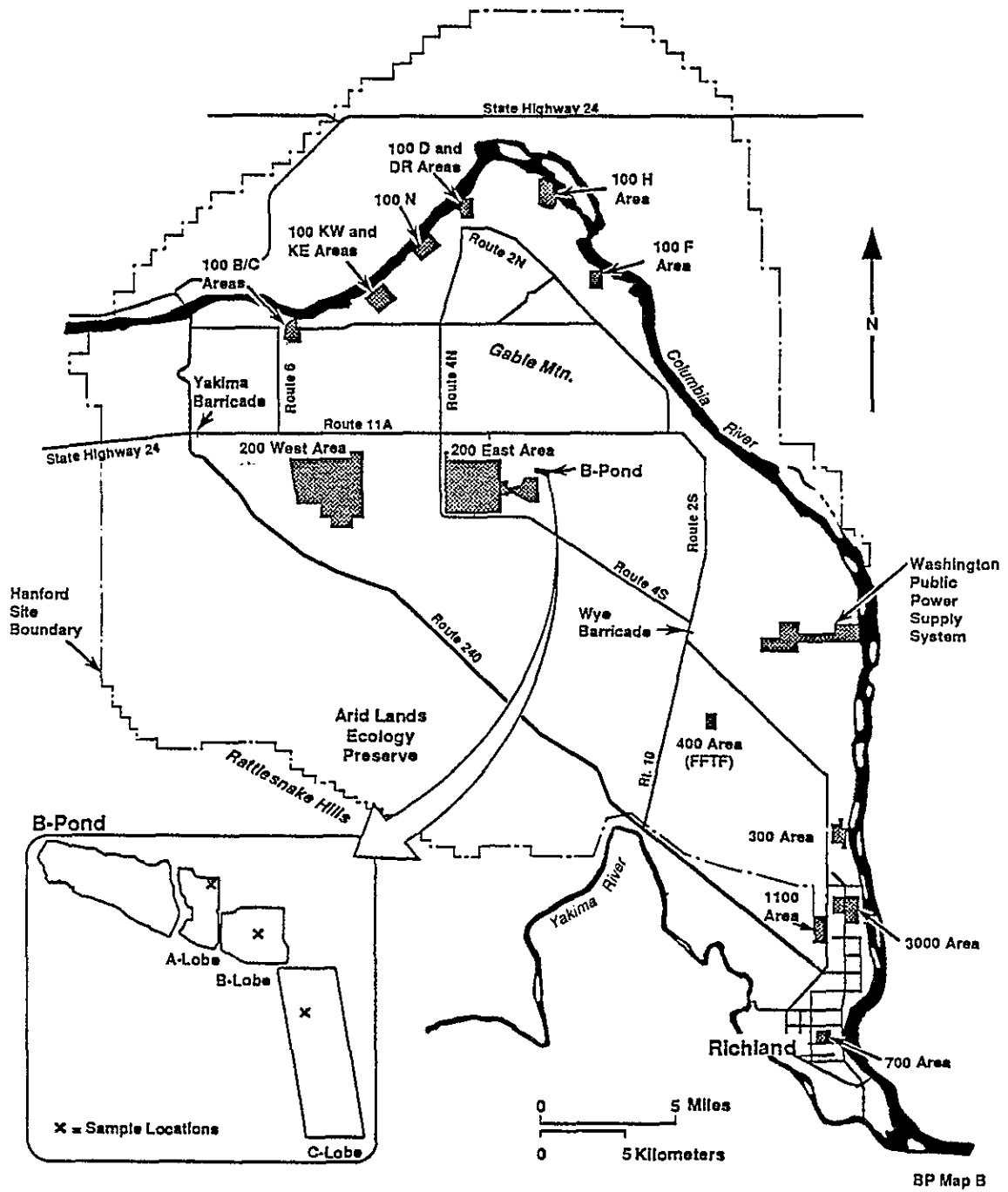
The B-Pond receives wastewater from a variety of sources in the 200 East Area. The system is fully described in the *216-B-3 Pond System Closure/Postclosure Plan* (closure plan) (DOE 1990). Wastewater enters the southwest side of the main pond via the 216-B-3-3 Ditch. The system is designed to handle in excess of 28,000,000 gal/day. The discharge primarily consists of atmospheric condensate, cooling water, potable water, and steam condensate (DOE 1990, p 3-1). In 1989, over 3,000,000,000 gallons of water were discharged to B-Pond (WHC 1990). Much of this is unfiltered, untreated water originating from the Columbia River. Current discharges to B-Pond are considered nonhazardous.

Some past discharges to B-Pond are suspected to have included waste that would currently be regulated under RCRA (DOE 1990, p 1-1). Some discharges have also included radioactive wastes.

Analysis of the pond soil and sediments is being conducted to assess the possible presence and extent of hazardous waste contamination (DOE 1990, p 7-1). Initial sampling efforts examined surface soil and sediment composition. (For more detail refer to WHC 1991.) Subsequent activities have involved drilling vadose zone boreholes.

This report summarizes the findings of three subsurface (vadose zone) temporary characterization boreholes: 699-43-41H, 699-42-41B, and 699-41-41. Areas investigated include the 3A Pond, the 3B Pond, and the 3C Pond (Figure 1-1). As proposed in the closure plan, one vadose zone borehole was drilled in each lobe (DOE 1990, p 7-16).

Figure 1-1. The Hanford Site and the Study Borehole Locations.



1.1 REGULATORY BACKGROUND

The U.S. Environmental Protection Agency (EPA) and Washington State Department of Ecology (Ecology) jointly administer RCRA in the State of Washington. The EPA retains oversight authority while delegating to Ecology enforcement of a state program consistent with or more stringent than the corresponding federal program. The implementing regulations can be found in the Washington Administrative Code (WAC) 173-303, "Dangerous Waste Regulations", and Title 40, Code of Federal Regulations (CFR), Parts 260-270. Ecology's authorization includes administering TSD closures. However, the state is currently not authorized to enforce the federal *Hazardous and Solid Waste Amendments of 1984* (HSWA), which includes RCRA corrective-action provisions.

The U.S. Department of Energy (DOE), EPA, and Ecology have entered into an agreement called the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989), commonly referred to as the Tri-Party Agreement. This agreement affects environmental regulation at the Hanford Site. One of purposes of this agreement was to ensure environmental impacts associated with past activities are investigated, and appropriate response actions taken as necessary to protect human health and the environment. The agreement seeks to promote this goal in part, by identifying TSD units, identifying which units will undergo closure and promote compliance with relevant RCRA permitting requirements. The agreement also establishes "operable units" for addressing potential environmental contamination from past practices.

The B-Pond is identified as a RCRA TSD unit that will be closed in accordance with applicable laws and regulations (Ecology et al. 1989, Appendix B). The B-Pond is considered an interim status, surface impoundment disposal unit (DOE 1990, p 1-1).

Although current liquid discharges to the pond are not considered hazardous or dangerous, RCRA closure has been necessitated by the concern that B-Pond soil and sediments may "contain" hazardous or dangerous waste from past activities. Environmental media such as water, soil, or sediments may be managed as a hazardous waste when they contain a *listed* waste (EPA Office of Solid Waste and Emergency Response memorandum, Cannon to Jorling, 1989, refer to Appendix C). Generally, regulated hazardous *characteristic* wastes, for instance wastes that are hazardous solely due to corrosivity, are no longer regulated hazardous wastes when they lose the characteristic that caused them to be managed as such (40 CFR 261.3 (a)(2)(i)). Dilution and neutralization for instance, can render a corrosive hazardous waste as nonhazardous.

Clean closure requires the demonstration that all dangerous and/or hazardous wastes or waste constituents posing any significant hazard to human health or the environment have been removed. The Tri-Party Agreement describes three types of closure: closure as a landfill, clean closure, and procedural closure (Ecology et al. 1989, Action Plan-Section 6.3). Clean closure is the planned option for the portion of B-Pond addressed by this report: the 3A, 3B, and 3C Ponds (DOE 1990, p 1-2). If a unit no longer contains significant hazardous waste or constituents, no physical closure action may be required.

According to the WAC 173-303, a specific scheme must be followed in determining whether or not a solid waste is a regulated hazardous waste. This

scheme requires knowledge of the process by which the waste was generated and the attributes of the waste. Current Washington State designation procedures (WAC 173-303-070), require generators to check their waste per specified criteria in a specific order.

Under the "Dangerous Waste Regulations," a dangerous waste means a solid waste designated via WAC 173-303-070 through 173-303-103 as either dangerous waste (DW) or extremely hazardous waste (EHW). Those regulations use the words "hazardous waste" to mean those solid wastes designated by 40 CFR 261, and regulated as hazardous by the EPA. This document will henceforth be consistent with existing state regulations by using the term "dangerous waste" to mean waste regulated by WAC 173-303, including DW, EHW, and EPA hazardous wastes.

Normally TSD units will have all hazardous *substances* addressed as part of the TSD closure. However, disposal units such as B-Pond being closed in conjunction with an operable unit may have hazardous substances (including radioactive constituents) addressed under the *Comprehensive Environmental Response, Compensation and Liability Act of 1980* (CERCLA) past-practice authority (Ecology et al. 1989, Action Plan p 6-4). "Hazardous substances" are defined in CERCLA Section 101(14). When investigation shows that a unit no longer contains substantial dangerous waste or constituents, any remaining CERCLA-only materials would be addressed as part of the past-practice process designated for that operable unit (Ecology et al. 1989, Action Plan p 6-4).

The B-Pond is part of the 200-BP-11 operable unit (Ecology et al. 1989, Appendix C).

1.2 PHYSICAL AND HISTORICAL SETTING

The B-Pond lies on an arid isolated tract of land near the center of the Hanford Site. Water is supplied to the pond system through a series of lines exiting the Site's 200 East Area. Water presently flows into the approximately 35-acre main pond through the 216-B-3-3 Ditch.

The vicinity of the main pond has received liquid effluent from activities in the 200 East Area since 1945. The level of the pond and the inflow have changed over time. Originally the pond was supplied through the 216-B-3-1 Ditch. In 1964 this ditch was replaced by the 216-B-3-2 Ditch. In 1970 the 216-B-3-2 Ditch was replaced by the 216-B-3-3 Ditch. The 216-B-3-3 Ditch is currently operative. Both the 216-B-3-1 and 216-B-3-2 Ditches were radioactively contaminated and were removed from service and filled with soil to reduce potential radioactive contaminant mobility.

The three expansion ponds, the 3A, 3B, and 3C Ponds, were placed in service much later than the main pond. Flow from the main pond is directed to the 3A Pond and then either to the 3B Pond or the 3C Pond. Flow is controlled. Use of the 3A Pond commenced in October 1983 (DOE 1990, p 2-19). The 3B Pond was in service from January 1984 until May 1985. The 3C Pond became operational in 1985.

The 3A Pond is a shallow pond approximately 11 acres and 12 ft deep. It was constructed using a cut-and-fill method. In January of 1984 the dike between the 3A and the 3B Ponds and adjacent to the connecting spillway failed

(DOE 1990, p 2-19). Overflow from the 3A Pond was contained in the previously unused 3B Pond. Flow to B-Pond was reduced, and the 3A and 3B Ponds were removed from service for repairs. A trench approximately 30 ft wide and 5 ft deep was excavated along part of the 3A Pond bottom to increase the pond's infiltration capacity. Discharge was resumed to 3A Pond at a temporarily reduced rate in the newly excavated area. A new spillway was constructed to connect 3B Pond. Debris from the dike failure was removed from 3B Pond. A system of infiltration trenches were excavated in 3B Pond. Both ponds were fully operational by June 1984.

The 3B Pond, which is currently dry, is also approximately 11 acres. It has not been used since being removed from service in May 1985 (DOE 1990, p 2-32). After being removed from service, the area was excavated to a depth below the bottom of the former trenches. According to the closure plan, up to 7 ft of material was excavated from the pond bottom (DOE 1990, p 2-32).

The 3C Pond, approximately 41 acres in total size, has a series of eight partially filled, parallel infiltration trenches into which water from 3A Pond is usually channelled. The water in 3C Pond has never risen above the tops of the trenches, which cover a much smaller total area than the pond itself. The trenches are not usually wet along their entire length. The water level and, therefore, the area wetted longitudinally vary with time.

A contingency pond, 216-E-28, was constructed in 1987 to provide emergency overflow capability for B-Pond. This contingency pond lies north and slightly west of the main pond. The area is dry and has never been used. The contingency pond is mentioned in this report only because it was one of two sites used to generate background values for earlier comparisons (WHC 1991).

Sagebrush and native plants populate the undisturbed areas around B-Pond. Typical littoral vegetation is naturally developing along the edge of the 3A Pond and the trenches of the 3C Pond. Each of the three expansion ponds is circumscribed by graveled and/or unimproved roads. Some adjacent areas disturbed by spillway construction, etc. have been revegetated.

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2.0 DISCUSSION OF RECENT WASTE HISTORY

This section summarizes dangerous waste releases to B-Pond since October 1983 as described in the closure plan (DOE 1990). The general period of operation for the expansion ponds was as follows:

3A Pond: October 1983 -- present
 3B Pond: January 1984 -- May 1985
 3C Pond: May 1985 -- present.

B-Pond had two points of inflow during the period from 1983 through 1992. Water continuously flowed into the 216-B-3-3 Ditch via a pipe at the headend. In addition, midway to the main pond, flow was supplemented by effluent from the 216-A-29 Ditch. Wastewater discharged at the headend of the 216-B-3-3 Ditch since October 1983 has included raw water, sanitary (potable) water, cooling water, steam condensate, filter backwash from the water treatment plant, etc. (DOE 1990, p 3-2). No contributing source has been identified as a dangerous waste.

The unlined 216-A-29 Ditch is a separate TSD unit. It had been used as an open ditch conveying wastewater to B-Pond. In 1991 it was decommissioned and backfilled. Wastewater from the PUREX chemical sewer line had been routinely released to the 216-A-29 Ditch before entering B-Pond. The open 216-A-29 Ditch extended over 2,000 ft before discharging into the 216-B-3-3 Ditch of B-Pond.

The closure plan (Rev. 0) lists the Plutonium/Uranium Extraction (PUREX) Plant chemical sewer line as the most likely contributor of any dangerous waste to B-Pond while the expansion ponds were operable (DOE 1990, p 4-3). Documented releases were assessed (DOE 1990, p 4-6). The following chemicals were traceable components of the chemical sewer line wastewater: potassium hydroxide, sodium hydroxide, cadmium nitrate, hydrazine, nitric acid, and sulfuric acid (DOE 1990, Table 4-3). A single documented release to the PUREX chemical sewer of solution containing ammonium fluoride and ammonium nitrate occurred in July 1985 (DOE 1990, p 4-7).

The chemical sewer line wastewater was conservatively judged to be a regulated dangerous waste during some of those documented releases. Applicable designation codes are D002, W002, U133, W001 and D006. These constitute all dangerous waste numbers listed on Revision 3 of the Part A, Form 3, *Dangerous Waste Permit Application* submitted for B-Pond (DOE 1990, p 1-10). The last chemical sewer discharge suspected of being a dangerous waste occurred in 1986 (DOE 1990, Table 4-3).

Each of the above releases to the 216-A-29 Ditch was designated as a dangerous waste based on characteristics or criteria, except for those releases containing hydrazine, a "listed" discarded chemical product (U133) (DOE 1990, Table 4-3). Wastes designated D002 are deemed hazardous based on corrosivity; D006, W001 and W002 wastes are regulated because of their toxicity. These designations were not made on the average or representative flow, but were based on specific incidences when high concentrations of chemicals were documented to have been released from the chemical sewer line to the 216-A-29 ditch.

The chemical sewer line wastewater attributes were estimated based on process knowledge, and were not measured nor estimated at the point that the 216-A-29 Ditch empties into the 216-B-3-3 Ditch of B-Pond. The closure plan specifically states that these designations were "at the point the chemical sewer line enters the environment" (DOE 1990, p 4-6). Further attenuation would occur as the liquid waste stream flowed the full length of the 216-A-29 Ditch, mixed with the additional flow of the 216-B-3-3 Ditch, and dispersed in the main lobe before any flow to 3A, 3B, or 3C Ponds.

9 3 1 2 7 6 1 0 5 9 5

3.0 SAMPLING ACTIVITIES

A Westinghouse Hanford Company (Westinghouse Hanford) sampling plan, *216-B-3 Pond Characterization of the Hazardous Waste Inventory in the Near-Surface Soil and Sediments* (WHC 1989a), in conjunction with approved modifications and procedures, has been used in the B-Pond site characterization effort. The sampling plan sets forth a phased approach toward characterizing the soils and sediments of B-Pond.

Phase 1 was an initial sampling effort assessing near-surface soil contamination within the main pond, the 216-B-3-3 Ditch, and the three expansion ponds. Phase 1 included measuring constituents in two types of background areas in the vicinity of the site. Phase 1 activities are summarized in *Phase 1 Characterization of the 216-B-3 Pond System* (WHC 1991).

Phase 2 is planned as an extension of the Phase 1 characterization work using data and knowledge gathered from Phase 1 and Phase 3.

Phase 3, the subject of this report, examines the vertical distribution of potential contaminants beneath the surface soil. Field activities involved drilling one vadose zone borehole in each of the expansion ponds. Soil samples were collected and submitted for chemical analyses similar to those performed in Phase 1. Additionally, some nonchemical data were collected in conjunction with the drilling effort. Each hole was logged by a qualified geologist as drilling was performed. Some samples were submitted for physical analyses, such as grain size. Gross gamma logging was also performed on each borehole.

3.1 OBJECTIVE AND SCOPE

The objective of Phase 3 characterization sampling was to collect data addressing the issue of potential vadose zone chemical contamination with dangerous waste. Efforts focused on the subsurface of the three expansion ponds. The current closure plan has proposed to address potential subsurface contamination in the main pond with the remedial activities of the operable unit, 200-BP-11. This report summarizes Phase 3 activities and findings.

This investigation was limited to the vadose zone, the portion of the earth's crust above the water table. "Soil" is meant to be understood in the context of environmental cleanup regulations. This report does not address groundwater.

3.2 ANALYTES INVESTIGATED

Although B-Pond was declared a RCRA TSD unit, current discharge to the unit is nondangerous waste. Although releases from the PUREX chemical sewer line to the 216-A-29 Ditch TSD have been documented, existence of the regulated characteristics or criteria in the downstream TSD (B-Pond) have been postulated, but not demonstrated. Substances of concern are concentrations of a potential waste residual that could cause the water, soil/(sediment), or subsoil to be managed as a dangerous waste under Ecology's "Dangerous Waste Regulations," (WAC 173-303).

Constituents and/or attributes not regulated under the "Dangerous Waste Regulations" are reported as part of the site characterization. It should not be inferred that all analytes are pertinent to determining whether or not a RCRA dangerous waste is present. For instance, the characteristic of radioactivity is not a criterion for determining whether or not a waste is a RCRA dangerous waste; however this information may be applicable to later CERCLA work at the site. With regard to listed waste, generally detection in an environmental media such as soil or sediment is sufficient to be of regulatory concern. However, the EPA has allowed hazardous waste management to cease when the constituents are less than de minimis levels--most commonly those posing no health threat when directly ingested.

Inorganic parameters measured in Phase 3 include those listed in Table 3-1.

Table 3-1. Inorganic Parameters.

Analyte	EPA Method	Analyte	EPA Method
Aluminum	6010	Magnesium	6010
Ammonia	350.3	Manganese	6010
Antimony	6010	Mercury	7471
Arsenic	7060	Molybdenum	6010
Barium	6010	Nickel	6010
Beryllium	6010	Nitrate	300.0
Boron	6010	Potassium	6010
Cadmium	6010	Selenium	7740
Calcium	6010	Silicon	6010
Chloride	300.0	Silver	6010
Chromium	6010	Sodium	6010
Cobalt	6010	Sulfate	300.0
Copper	6010	Sulfide	376.1
Cyanide	9010	Thallium	7841
Fluoride	300.0	Vanadium	6010
Iron	6010	Zinc	6010
Lead	7421		

Split samples were analyzed and reported according to Contract Laboratory Program (CLP) protocol found in the March 1990 Statement of Work (SOW) for Inorganic Analysis. The following inorganic analytes were reported for split samples: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

Organic compounds evaluated at the primary laboratory include those listed in Table 3-2.

Table 3-2. Organic Parameters.

Analytical Class	EPA/Other Method	Analytical Class	EPA/Other Method
Pesticides/Polychlorinated biphenyls (PCBs)	8080	Dioxins/Furans	8280
Herbicides	8150	Volatile Organic Compounds	ACD 2440 ¹
Organophosphorous Pesticides	8140	Base/Neutral/Acid (BNA) Compounds	ACD 2470 ²

¹ Laboratory-specific, volatile organic analysis (VOA) method based on CLP protocol.

² Laboratory-specific, base/neutral/acid (BNA) analysis method based on CLP protocol.

The specific chemicals reported for each of the above categories can be found in Appendix A. These lists contain only those routinely reported compounds in each class. Additional volatile and semivolatile compounds could be reported as tentatively identified compounds (TICs).

Some split samples were also analyzed and reported according to CLP protocol for the following organic analytes:

Target Compound List Volatiles (CLP SOW 2/88--Rev. 5/89)
 Target Compound List Semivolatiles (CLP SOW 2/88--Rev. 5/89)
 Pesticide and PCB Target Compounds (CLP SOW)

One split, sample B00GW5, was analyzed for semivolatiles by EPA 8270.

Radioactivity measurements were also made on Phase 3 soil samples. Gross alpha, beta activity, ⁹⁰Sr, and gamma activity radiochemical analyses were conducted using EPA-900 series procedures.

A sample key showing sample identification numbers and associated field data can be found in Table 3-3.

Table 3-3. B-Pond Phase 3 Borehole Sample Key.
(3 sheets)

Sample	Type	Pond	Depth ^a	Collection Date	Interval ^b		Classification from Borehole Log
B00FK6	Reg	3A	6.5	2/7/91	4.95	7.55	Silty Sand
B00FK7	Reg	3A	8.5	2/7/91	6.9	10.2	"
B00FK8	Reg	3A	10.5	2/7/91	9.6	11.75	Sand
B00FK9	Reg	3A	13	2/7/91	11.8	14.0	Sandy Gravel
B00FL0	Reg	3A	14.5	2/7/91	13.5	15.7	"
B00FL1	Reg	3A	16	2/8/91	14.7	17.0	"
B00FL2	Phys	3A	21.5	2/11/91	20.4	23	"
B00FL3	Blank	3A	---	2/11/91	NA		(Silica Sand Control Sample)
B00FL4	Reg	3A	28	2/11/91	26.4	29.3	Sandy Gravel
B00GR9	Fdup	3A	28	2/11/91	26.4	29.3	"
B00GS0	Reg	3A	31.5	2/11/91	30.5	32.6	"
B00GS1	Reg	3A	36.5	2/12/91	35.55	37.71	Sandy Gravel/ Slightly Silty Sand/ Sand
B00GS2	Reg	3A	42	2/13/91	40.4	43.25	Sand
B00GS3	Reg	3A	46.5	2/13/91	45.45	48.0	"
B00GS6	Phys	3A	52 ^c	2/14/91	51.13	54.10	Silty Sand
B00GS4	Reg	3A	52.5	2/14/91	51.13	54.10	Sandy Silt
B00GS5	Split	3A	52.5	2/14/91	51.13	54.10	"
B00GS7	Phys	3A	54.5	2/14/91	53.0	55.6	Sandy Silt/ Sand
B00GS8	Reg	3A	57	2/14/91	56	58.4	Sand
B00GS9	Reg	3A	66.5	2/15/91	65.35	67.65	Sandy Gravel
B00GT0	Phys	3A	68.5	2/15/91	67.5	69.65	Sand
B00GT1	Reg	3A	77	2/19/91	75.7	77.90	"
B00GT2	Phys	3A	77	2/19/91	75.7	77.90	"
B00GT3	Blank	3A	---	2/20/91	NA		(Silica Sand Control Sample)
B00GT4	Reg	3A	85.5	2/21/91	84.1	86.68	Sand
B00GT5	Fdup	3A	85.5	2/21/91	84.1	86.68	"
B00GT6	Split	3A	85.5	2/21/91	84.1	86.68	"
B00GT7	Reg	3A	97	2/21/91	95.7	98.3	Sandy Gravel
B00GT8	Reg	3A	102	2/22/91	101.6	102.2	Slightly Silty, Slightly Gravelly Sand
B00GT9	Phys	3A	102	2/22/91	101.6	102.2	"
B00GV0	Reg	3A	122	2/26/91	120.7	123.2	Sandy Gravel
B00GV1	Blank	3A	---	2/27/91	NA		(Silica Sand Control Sample)
B00GV2	Reg	3A	131	2/27/91	129.9	132.05	Sandy Gravel
B00GV3	Fdup	3A	131	2/27/91	129.9	132.05	"
B00GV4	Split	3A	131	2/27/91	129.9	132.05	"
B00GV5	Reg	3A	143.5	2/28/91	142.75	143.85	"
B00GV6	Reg	3B	1	3/4/91	0	2	Silty Sandy Gravel
B00GV7	Reg	3B	3.5	3/4/91	2.5	4.5	"
B00GV8	Reg	3B	5.5	3/4/91	4	6.55	"

Table 3-3. B-Pond Phase 3 Borehole Sample Key.
(3 sheets)

Sample	Type	Pond	Depth ^a	Collection Date	Interval ^b		Classification from Borehole Log
B00GV9	Blank	3B	---	3/5/91	NA		(Silica Sand Control Sample)
B00GW0	Reg	3B	7.5	3/5/91	6.2	8.4	Sand
B00GW1	Reg	3B	9.5	3/5/91	8.2	10.85	"
B00GW2	Phys	3B	9.5	3/5/91	8.2	10.85	"
B00GW3	Reg	3B	13	3/5/91	11.4	14.1	Sandy Gravel
B00GW4	Fdup	3B	13	3/5/91	11.4	14.1	"
B00GW5	Split	3B	13	3/5/91	11.4	14.1	"
B00GW6	Reg	3B	16	3/5/91	14.4	17.1	Silty Sandy Gravel
B00GW7	Phys	3B	16	3/5/91	14.4	17.1	"
B00GW8	Reg	3B	21	3/6/91	19.2	22.5	"
B00GW9	Reg	3B	28	3/6/91	25.9	29.6	"
B00GX0	Phys	3B	28	3/6/91	25.9	29.6	"
B00GX1	Phys	3B	28	3/6/91	25.9	29.6	"
B00GX2	Reg	3B	31	3/6/91	29.5	32.2	"
B00GX3	Reg	3B	35.5	3/7/91	34.0	36.8	"
B00GX4	Reg	3B	40	3/7/91	38.8	41.4	"
B00GX5	Reg	3B	52	3/8/91	50.8	52.95	Silty Sandy Gravel/ Silty Gravel
B00GX6	Reg	3B	61.5	3/8/91	60.0	62.6	Silty Sandy Gravel/ Sand
B00GX7	Phys	3B	61.5	3/8/91	60.0	62.6	"
B00GX8	Reg	3B	70.5	3/8/91	69.6	71.8	Silty Sandy Gravel
B00GX9	Phys	3B	73	3/11/91	72.25	74.15	"
B00GY0	Blank	3B	---	3/12/91	NA		(Silica Sand Control Sample)
B00GY1	Reg	3B	80.5	3/12/91	79.75	81.5	Gravelly Sand
B00GY2	Fdup	3B	80.5	3/12/91	79.75	81.5	"
B00GY9	Split	3B	80.5	3/12/91	79.75	81.5	"
B00GZ0	Phys	3B	84.5	3/12/91	83.0	85.9	Silty Sandy Gravel
B00GZ1	Phys	3B	84.5	3/12/91	83.0	85.9	"
B00GZ2	Reg	3B	90.5	3/12/91	89.	91.85	"
B00GZ3	Reg	3B	105	3/14/91	103.9	106.35	"
B00GZ4	Phys	3B	105	3/14/91	103.9	106.35	"
B00GZ5	Phys	3B	105	3/14/91	103.9	106.35	"
B00GZ6	Reg	3B	118.5	3/15/91	117.5	119.3	Silt
B00GZ7	Phys	3B	118.5	3/15/91	117.5	119.3	"
B00GZ8	Reg	3B	123.5	3/18/91	122.3	124.7	"
B00H00	Reg	3C	1	3/15/91	0	2	Sandy Gravel
B00H01	Reg	3C	3	3/15/91	1.5	4	"
B00H02	Reg	3C	5	3/15/91	3.87	5.8	"
B00H03	Reg	3C	7	3/18/91	5.93	7.95	"
B00H04	Reg	3C	9	3/18/91	7.93	9.73	"
B00H05	Fdup	3C	9	3/18/91	7.93	9.73	"

Table 3-3. B-Pond Phase 3 Borehole Sample Key.
(3 sheets)

Sample	Type	Pond	Depth ^a	Collection Date	Interval ^b		Classification from Borehole Log
B00H06	Reg	3C	11.5	3/18/91	10.6	11.93	Sandy Gravel/ Sand
B00H07	Split	3C	11.5	3/18/91	10.6	11.93	"
B00H08	Phys	3C	12.5	3/19/91	11.7	13.7	Sand
B00H09	Reg	3C	16	3/19/91	15.0	17.0	Gravelly Sand
B00H10	Blank	3C	---	3/20/91	NA		(Silica Sand Control Sample)
B00H11	Reg	3C	20.5	3/20/91	19.5	21.5	Sandy Gravel
B00H12	Phys	3C	26.5	3/20/91	25.6	27.8	Gravel
B00H13	Phys	3C	26.5	3/21/91	25.6	27.8	"
B00H14	Reg	3C	30	3/21/91	29	31	Slightly Gravelly Sand
B00H15	Reg	3C	36	3/25/91	34.8	37.6	Sandy Gravel
B00H16	Reg	3C	40.5	3/25/91	39	41.8	"
B00H17	Fdup	3C	40.5	3/25/91	39	41.8	"
B00H18	Reg	3C	50	3/25/91	48.8	50.8	"
B00H19	Reg	3C	60	3/26/91	59.3	61.1	"
B00H20	Reg	3C	70.5	3/27/91	69.3	71.5	"
B00H21	Blank	3C	---	3/27/91	NA		(Silica Sand Control Sample)
B00H22	Phys	3C	78	3/27/91	76.9	79.4	Sandy Gravel
B00H23	Reg	3C	80	3/27/91	79.4	80.9	"
B00H24	Split	3C	80	3/27/91	79.4	80.9	"

^a Logbook interval midpoint rounded to the closest 1/2-ft.^b Source: Project Field Logbook.^c Sample collected from liners 51.6-52.1 ft below surface.

Type:

Reg = Regular sample for chemical analysis

Phys = Sample for physical analysis

Blank = Field originated, equipment "blank" silica sand sample for chemical analysis

Fdup = Field duplicate sample for chemical analysis

Split = Split sample for independent chemical analysis

3.3 DESCRIPTION OF FIELD ACTIVITIES

3.3.1 The 3A Pond

Several months before drilling, clean fill was used to construct a pad extending over a small portion of 3A Pond. This pad was located along the north shore of the pond, approximately 25 yd from the east corner.

Field sampling was initiated at the 3A Pond. The borehole, BH 3A-1, (later designated 699-43-411) penetrated the former pond bottom. The first sample submitted for chemical analysis was collected February 7, 1991. Samples were planned at 2-ft intervals for the first 10 ft below the former pond bottom and at decreasing intervals thereafter until reaching groundwater. All depths were referenced to the ground surface. The pond bottom was encountered at approximately 6.5 ft.

A cable tool drilling rig was used to drill the borehole. Drill rigs are decontaminated before use. Samples were collected using a 5-in. outside diameter stainless steel split tube with stainless steel liners. A 10-in. outside diameter, schedule 40 casing was first used, followed by 8- then 6-in. The 10-in. casing string was set at 20.4 ft. The 8-in. casing was set at 77.7 ft. Samples were collected per procedures of the *Environmental Investigations and Site Characterization Manual*, WHC-CM-7-7 (WHC 1989b). Samples for chemical analysis were placed in supplier-cleaned glass bottles.

Samples were screened for radioactivity using hand-held instruments. A field photoionization detector (PID) was used to monitor for organic vapors. No evidence of radioactive or organic contamination was found. Aliquots submitted to an onsite laboratory also revealed no evidence of radioactive contamination. All aliquots were found to be below applicable administrative limits for release from all radiologic controls. Applicable limits during the project were detectable readings above background with field instruments or laboratory results exceeding either 60 $\mu\text{Ci/g}$ alpha or 200 $\mu\text{Ci/g}$ total activity, including beta/gamma.

Gross gamma logging was performed on three separate days:

<u>DATE</u>	<u>LOG INTERVAL (FT)</u>
February 8, 1991	5-19
February 20, 1991	4-79
March 1, 1991	45-142.

Larger cobbles and boulders made drilling difficult at approximately the 100-ft level. After samples B00GT8 and B00GT9 were collected (101.0-102.2 ft), hardtooling was first employed. This required the addition of some raw (Columbia River) water to the borehole. Drilling improved below 105 ft, and hardtooling was discontinued. A small amount (approximately 0.5 gal) of raw water was required at 112 ft to get recovery in the core barrel. The next sample interval was 120.7-123.2 ft, sample B00GV0.

The final sample from the 3A Pond borehole was collected February 28, 1991 from a recorded depth of 142.75-143.85 ft. Recovery in the split spoon

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was estimated at only 50 percent. Observations in the field log note the sample as "very wet." The water level was measured at 142.75 ft from the surface. Later, the casing was removed, and the borehole was backfilled, abandoned, and marked according to standard procedures--*Plugging and Abandoning Characterization Boreholes* Environmental Investigation Instruction (EII) 6.5 (WHC 1989b).

3.3.2 The 3B Pond

A cleaned cable tool drilling rig was set up at 3B Pond in late February 1991. The borehole, BH 3B-1, (later designated 699-42-41B) was located in the center of the dry lobe. Drilling equipment was routinely cleaned per EII 5.4 (WHC 1989b) before delivery/use at the site. Likewise, direct contact sampling equipment (split tube assemblies, bowls, spoons, etc.) is specially cleaned before use per EII 5.5, *1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment*, (WHC 1989b).

Sampling was initiated March 4, 1991. The first sample, BOOGV6, was collected with a split tube over the 0 to 2-ft interval. Recovery of sample BOOGV6 and the next two samples was estimated at 50 percent because of the coarse gravelly nature of the soil. Finer material was found below a depth of 7 ft.

Drilling method and sampling frequency were similar to the other two boreholes. Samples were planned at 2-ft intervals for the first 10 ft and at decreasing intervals thereafter until reaching groundwater. Samples were collected as previously described for the 3A Pond, except that there was no fill material overlying the area to be investigated. All depths were referenced to the ground surface. The 10-in. casing string was set at 21.1 ft. The 8-in. casing was set at 78.2 ft. Samples were screened with field instruments for radioactivity and/or hazardous organic vapors. No evidence of radioactivity or organic vapors was found.

Gross gamma logging of the 3B Pond borehole was also performed on the following three separate days:

<u>DATE</u>	<u>LOG INTERVAL (FT)</u>
March 6, 1991	5-21
March 11, 1991	4-79
March 19, 1991	45-122.

The borehole was advanced by drive barrel to approximately 74 ft before it was necessary to add any water. Only 1 gal of raw water was added to progress drilling. This was about 6 ft above the next sample interval, 79.8 - 81.5 ft. Two samples, BOOGY1 and BOOGY2, were taken for chemical analysis from the bottom two liners at this next interval.

A sample for physical analysis, BOOGZ0, was collected from an interval beginning at 83.0 ft. Although recovery in the split tube was good (est. 75 percent), there was insufficient volume for a representative grain size analysis because of the amount of cobble. Sample BOOGZ1 was subsequently

collected from the 5-in-diameter drive-barrel cleanout and submitted for grain size.

Hard-tool drilling was required at 95-103 ft and at 109-113 ft. Thirty gallons of raw water were used. Samples for chemical analysis potentially affected by added raw water are B00GZ3, B00GZ4, and B00GZ6. In each case, several feet of soil remained above the respective intervals when the last of the water was added.

The final sample, B00GZ8, a wet silt, was collected March 18, 1991. Final depth of the borehole was 124.7 ft. The casing was later pulled and the borehole abandoned per standard procedures (WHC 1989b, EII 6.5).

3.3.3 The 3C Pond

Sampling in 3C Pond began on March 15, 1991. The borehole, BH 3C-1, (later designated 699-41-4) was located on dry ground between trenches in the northwest quadrant of the lobe. The water surface in the adjacent trench was several feet below ground level at the borehole. The 3C Pond (a series of trenches) was in active use at the time of this investigation, similar to 3A Pond.

Drilling and sampling methods were identical to those previously described. As with boreholes drilled earlier, sampling was more frequent in the top portion of the borehole. Field monitoring of the samples showed no radioactivity or hazardous organic vapors. Five samples were collected in the first 10 ft. Samples for chemical analysis were collected using a 5-in. outside-diameter split tube sampler. The 10-in. casing string was set at 32.1 ft. An 8-in. casing was used for the remainder of the borehole.

Most of the borehole was wet. Early samples were damp, but moisture appeared to increase at about 18 ft. When drilling started at 19 ft, March 20, there was no standing water in the hole. However, some difficulty was experienced keeping material in the drive barrel. Moisture was a factor. Poor sample recovery limited planned analyses in the 20-25 ft range. On the morning of March 21, there was standing water in the hole. The starting depth was 27.8 ft. Moist conditions abated, but did not cease for the remainder of the borehole.

Gross gamma logging at the 3C Pond was performed on two days as follows:

<u>DATE</u>	<u>LOG INTERVAL (FT)</u>
March 22, 1991	5-32
March 28, 1991	0-77.

Soil below 74 ft was noticeably wetter. Intermittent saturated zones were experienced to 80 ft. It was decided to terminate the borehole at this level because of continuing high moisture conditions. Final depth of the borehole was 80.9 ft.

The casing was removed and the borehole filled and abandoned in accordance with standard procedures (WHC 1989b, EII 6.5). As with previous sites, a brass survey marker was placed at the location.

Sample B00GS5, originating from the borehole at the 3C Pond, was later reported by the laboratory as sample B00GS. Based on date of submittal, analyses requested, and review of documentation associated with the sample this was determined to be simply a typographical error on the part of the laboratory and will not affect interpretation of the results.

9 3 1 2 7 5 1 0 6 0 5

4.0 SUMMARY OF RESULTS

4.1 ORGANIC CHEMICAL RESULTS

Organic analyses were performed on a subset of project samples in accordance with project plans. All regular samples identified below were analyzed for pesticides/PCBs, herbicides, organophosphorous pesticides, volatile organic compounds, and BNA compounds.

3A Pond: B00FK6, B00FK7, B00FK8, B00FK9, B00FL0, B00FL1, B00FL4, B00GS4, B00GS9, B00GT7, B00GV5

3B Pond: B00GV6, B00GV7, B00GV8, B00GW0, B00GW1, B00GW3, B00GW8, B00GX6, B00GZ2, B00GZ6, B00GZ8

3C Pond: B00H00, B00H01, B00H02, B00H03, B00H04, B00H06, B00H14, B00H19, B00H23

A subset of the above were analyzed for dioxin and furan homologs. This included all samples except B00GX6, B00GZ2, B00GZ6, B00GZ8, B00H01, B00H04, B00H06, B00H14, B00H19, and B00H23. More analyses were performed than were requested by Westinghouse Hanford. One planned dioxin analysis (sample B00H01 from 1.5- to 4-ft level of 3C Pond) was inadvertently omitted by the laboratory. An examination of the Sample Analysis Request forms shows the primary laboratory did not correctly forward requests/samples to their subcontracted laboratory.

Results of silica sand samples (B00FL3, B00GV9, B00H10), field duplicates (B00GW4, B00H05, B00GR9) and split samples (B00H07, B00GW5, B00GS5) are discussed with each group summary appearing below.

Results of all regular samples analyzed for organic compounds are summarized in Table 4-1. Organic constituents of interest were generally undetected.

Nearly all results have been qualified as estimated, flagged with a "J" by Westinghouse Hanford's Office of Sample Management (OSM). The most common reason is the comparison of sample (soil) holding times before extraction to holding times applicable to water matrices. Compounds not on routine target lists may have been reported as TICs. All TICs were routinely qualified as estimated, "J", by the reporting laboratory.

Table 4-1. Summary of Phase 3 Organic Analyses.

Analytical Class	Protocol Used	Pond	Number of Reg. Samples	All Analytes < Detection Limit	Remarks
Pesticides/PCB	EPA 8080	3A	11	Yes	
		3B	11	Yes	
		3C	9	Yes	
Herbicides	EPA 8150	3A	11	Yes	
		3B	11	Yes	
		3C	9	Yes	
Organophosphorous Pesticides	EPA 8140	3A	11	Yes	List A (App. C)
		3B	11	Yes	List A, List B for 4 lowermost
		3C	9	Yes	List B (App. C)
Dioxins/Furans	Modified EPA 8280	3A	11	Yes	(More analyses than requested)
		3B	7	Yes	
		3C	3	Yes	
Volatile Organic Compounds	ACD 2440 (CLP VOA Protocol)	3A	11	No	Low level Acetone, Methylene Chloride, and 4-Methyl-2-pentanone
		3B	11	No	Low level 4-Methyl-2-pentanone
		3C	8	No	Low level Acetone
Base/Neutral/Acid Compounds (Semivolatiles)	ACD 2470 (CLP BNA Protocol)	3A	11	No	Multiple compounds reported
		3B	11	No	Multiple compounds reported
		3C	9	No	Multiple compounds reported

4.1.1 Pesticides/PCBs

Tables 4-2 and 4-3 summarize results of the pesticides/PCB analyses. Table 4-2 is based on the results of the 31 regular soil samples sent to the primary laboratory. Table 4-3 shows the numerical results of each of the three samples sent to the split laboratory. All regular, field duplicate, field split, and silica sand sample results are provided in Appendix A.

All pesticides and PCB results were reported as nondetectable by the laboratory, or were qualified as nondetected upon validation. Some laboratory reagent blanks at the primary laboratory contained traces of target analytes (Arochlor-1254, beta-BHC, and Lindane). Some immediately associated B-Pond soil samples also contained those analytes at very low levels--less than the valid sample quantitation limit (SQL). Consistent with established data validation protocol, OSM qualified some data as undetected at the SQL based upon results of laboratory reagent blanks. No other analytes were reported by the laboratory without an undetected ("U") laboratory qualification.

All samples, including silica sand and field duplicates, were extracted outside the 7-day criterion applicable to certain water analyses, and were thus qualified "J" by Westinghouse Hanford. All extracts were analyzed within the allotted 40 days following extraction. High surrogate recovery on sample B00H01 also contributed to Westinghouse Hanford's "J" qualification for all analytes of that sample, although no target compounds were found. Recovery was 193 percent, slightly outside the laboratory-reported quality control (QC) limits of 20-150 percent for a 105- $\mu\text{g/Kg}$ nominal spike.

Results of each of the three silica sand and field duplicate samples were consistent with the above. All values were reported as undetected by the laboratory or were qualified as undetected at the SQL. All six samples were reported with sub-SQL concentrations of arochlor-1254, and were qualified as undetected at the SQL. Two silica sand field blanks (B00FL3 and B00H10) and one field duplicate (B00GR9) reported by the laboratory with less than SQL traces of lindane were subsequently qualified as undetected at the SQL based on laboratory reagent blank results. The field duplicate B00GR9 contained a trace of beta-BHC (0.77J $\mu\text{g/Kg}$) that was qualified as undetected at the SQL (13 $\mu\text{g/Kg}$). No trace of beta-BHC was found in the associated regular sample, B00FL3; laboratory reported value, 13 U $\mu\text{g/Kg}$.

Split samples were analyzed according to criteria set forth in the CLP for pesticide and PCB target compounds. Validated results are shown in Table 4-3. Results confirm those of the primary laboratory. Targeted compounds were undetectable in site samples. Compounds for which there were trace contamination problems at the primary laboratory were undetected in samples analyzed at the split laboratory. One split sample, B00GS5, was also associated with a high surrogate spike recovery. This was attributed to a co-eluting interference. Seven of 12 matrix spike recoveries were outside EPA QC limits. Although all analytes were undetected, results for B00GS5 were consequently qualified "J" by Westinghouse Hanford.

Table 4-2. Pesticides/PCB Sample Result Summary
-- 31 Regular Samples.

ANALYTE	CAS #	ALL RESULTS < DETECTION LIMIT ?	DETECTION LIMIT RANGE µg/Kg	MEDIAN µg/Kg
4,4'-DDE	72-55-9	Yes	25 UJ - 310 UJ	120 UJ
4,4'-DDD	72-54-8	Yes	25 UJ - 310 UJ	120 UJ
4,4'-DDT	50-29-3	Yes	25 UJ - 310 UJ	120 UJ
Aldrin	309-00-2	Yes	13 UJ - 160 UJ	62 UJ
alpha BHC	319-84-6	Yes	13 UJ - 160 UJ	62 UJ
beta BHC	319-85-7	Yes	13 UJ - 160 UJ	62 UJ
delta BHC	319-86-8	Yes	13 UJ - 160 UJ	62 UJ
gamma BHC (Lindane)	58-89-9	Yes	13 UJ - 160 UJ	62 UJ
alpha-Chlorodane	5103-71-9	Yes	130 UJ - 1600 UJ	620 UJ
gamma-Chlorodane	5103-74-2	Yes	130 UJ - 1600 UJ	620 UJ
Dieldrin	60-57-1	Yes	25 UJ - 310 UJ	120 UJ
Endosulfan I	959-98-8	Yes	13 UJ - 160 UJ	62 UJ
Endosulfan II	33213-65-9	Yes	25 UJ - 310 UJ	120 UJ
Endosulfan Sulfate	1031-07-8	Yes	25 UJ - 310 UJ	120 UJ
Endrin	72-20-8	Yes	25 UJ - 310 UJ	120 UJ
Endrin Ketone	53494-70-5	Yes	25 UJ - 310 UJ	120 UJ
Heptachlor	76-44-8	Yes	13 UJ - 160 UJ	62 UJ
Heptachlor Epoxide	1024-57-3	Yes	13 UJ - 160 UJ	62 UJ
Methoxychlor	72-43-5	Yes	130 UJ - 1600 UJ	620 UJ
Toxaphene	8001-35-2	Yes	250 UJ - 3100 UJ	1200 UJ
Arochlor 1016	12674-11-2	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1221	11104-28-2	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1232	11141-16-5	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1242	53469-21-9	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1248	12672-29-6	Yes	120 UJ - 180 UJ	130 UJ
Arochlor 1254	11097-69-1	Yes	240 UJ - 360 UJ	260 UJ
Arochlor 1260	11096-82-5	Yes	240 UJ - 360 UJ	260 UJ

U Compound was analyzed for but not detected at the stated limit.
J Indicates an estimated value.

Table 4-3. Split Sample Results for Pesticides/PCBs.

ANALYTE	CAS #	B00H07 µg/Kg	B00GW5 µg/Kg	B00GS5 ^a µg/Kg	Median ^b Regular Sample µg/Kg
4,4'-DDE	72-55-9	17 U	16 UJ	19 UJ	120 UJ
4,4'-DDD	72-54-8	17 U	16 UJ	19 UJ	120 UJ
4,4'-DDT	50-29-3	17 U	16 UJ	19 UJ	120 UJ
Aldrin	309-00-2	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
alpha BHC	319-84-6	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
beta BHC	319-85-7	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
delta BHC	319-86-8	8.3 UJ	8.0 UJ	9.7 UJ	62 UJ
gamma BHC (Lindane)	58-89-9	8.3 U	8.0 UJ	9.7 UJ	62 UJ
alpha-Chlorodane	5103-71-9	83 UJ	80 UJ	97 UJ	620 UJ
gamma-Chlorodane	5103-74-2	83 UJ	80 UJ	97 UJ	620 UJ
Dieldrin	60-57-1	17 U	16 U	19 UJ	120 UJ
Endosulfan I	959-98-8	8.3 U	8.0 UJ	9.7 UJ	62 UJ
Endosulfan II	33213-65-9	17 U	16 U	19 UJ	120 UJ
Endosulfan Sulfate	1031-07-8	17 U	16 UJ	19 UJ	120 UJ
Endrin	72-20-8	17 UJ	16 U	19 UJ	120 UJ
Endrin Ketone	53494-70-5	17 U	16 U	19 UJ	120 UJ
Heptachlor	76-44-8	8.3 U	8.0 U	9.7 UJ	62 UJ
Heptachlor Epoxide	1024-57-3	8.3 U	8.0 U	9.7 UJ	62 UJ
Methoxychlor	72-43-5	83 U	80 U	97 UJ	620 UJ
Toxaphene	8001-35-2	170 U	160 U	190 UJ	1200 UJ
Arochlor 1016	12674-11-2	83 U	80 U	97 UJ	130 UJ
Arochlor 1221	11104-28-2	83 U	80 U	97 UJ	130 UJ
Arochlor 1232	11141-16-5	83 U	80 U	97 UJ	130 UJ
Arochlor 1242	53469-21-9	83 U	80 U	97 UJ	130 UJ
Arochlor 1248	12672-29-6	83 U	80 U	97 UJ	130 UJ
Arochlor 1254	11097-69-1	170 U	160 U	190 UJ	260 UJ
Arochlor 1260	11096-82-5	170 U	160 U	190 UJ	260 UJ

^a Sample misidentified on Form 1 as "B00-GS".^b For comparison to split sample results.

U Compound was analyzed for but not detected at the stated limit.

J Indicates an estimated value.

B00H07 and B00GW5 qualified "UJ" for some analytes because of a minor calibration anomaly.

B00GS5 qualified "UJ" because of high surrogate and high matrix spike recoveries.

4.1.2 Herbicides

Analytical results were reported for 2,4-D (CAS # 94-75-7) and 2,4,5-TP, also known as Silvex, (CAS # 93-72-1). Both herbicides were undetected in all regular site samples, field duplicates and field silica sand samples. Sample reporting limits ranged widely. Validated results ranged from 28 UJ - 4900 UJ $\mu\text{g/Kg}$ for 2,4-D, and 3 UJ - 240 UJ $\mu\text{g/Kg}$ for 2,4,5-TP. The median regular sample result for 2,4-D was 150 UJ $\mu\text{g/Kg}$. The median regular sample result for 2,4,5-TP was 15 UJ $\mu\text{g/Kg}$. All regular, field duplicate, field split and silica sand sample results are shown in Appendix A.

All values were qualified by Westinghouse Hanford as "J" because the pre-extraction holding time exceeded the 7 day criterion established for water samples. Once extracted, all samples were analyzed within the appropriate 40-day period. 2,4,5-TP was detected in one laboratory reagent blank, but no results were qualified because herbicides were undetected in all site samples.

Split samples were not analyzed for herbicides.

4.1.3 Organophosphorous Pesticides

Organophosphorous pesticides were undetected in all soil samples. All results were qualified by Westinghouse Hanford because extraction was outside the 7-day criterion applicable to certain water analyses. Once extracted, all samples were analyzed within the appropriate 40-day period.

Organopesticide analyses were subcontracted by the primary laboratory. One of the applicable contracts changed during the Phase 3 project. This resulted in an increase in the number of analytes reported for about 40 percent of the samples. All analytes were still undetected. Samples with the increased analyte list include the following:

- All samples from the borehole at the 3C Pond
- Samples B00GX6, B00GZ2, B00GZ6, and B00GZ8 from the 3B Pond
- Silica sand B00H10
- Field duplicate B00H05.

All regular, field duplicate and silica sand sample results are shown in Appendix A.

Tables 4-4a and 4-4b summarize the reporting limits for all regular field samples and analytes. Silica sand and field duplicates were reported to similar limits. No contaminants were reported in laboratory blanks.

Split samples were not analyzed for organophosphorous pesticides.

Table 4-4a. Organophosphorous Pesticide Reporting -- 18 Regular Samples (Short List).

ANALYTE	CAS #	ALL RESULTS < DETECTION LIMIT ?	DETECTION LIMIT RANGE mg/Kg	MEDIAN mg/Kg
Dimethoate	60-51-5	Yes	0.10 UJ - 0.13 UJ	0.11 UJ
Disulfoton	298-04-4	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Parathion ethyl	156-38-2	Yes	0.10 UJ - 0.13 UJ	0.11 UJ
Parathion methyl	298-00-0	Yes	0.10 UJ - 0.13 UJ	0.11 UJ
Phorate	298-02-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Sulfotepp	3689-24-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Famphur	52-85-7	Yes	0.16 UJ - 0.19 UJ	0.16 UJ
Thionazin	297-97-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
o,o,o-Triethyl phosphorothioate	126-68-1	Yes	0.03 UJ - 0.03 UJ	0.03 UJ

U Compound was analyzed for but not detected at the stated limit.
J Indicates an estimated value.

Table 4-4b. Organophosphorous Pesticide Reporting -- 13 Regular Samples (Long List).

ANALYTE	CAS #	ALL RESULTS < DETECTION LIMIT ?	DETECTION LIMIT RANGE mg/Kg	MEDIAN mg/Kg
Azinphos methly	86-50-0	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Chlorpyrifos	2981-88-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Chlorpyrifos methyl	5598-13-0	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Coumaphos	56-72-4	Yes	0.21 UJ - 0.26 UJ	0.21 UJ
Demeton	8065-48-3	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Diazanone	333-41-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
DDVP (Dichlorvos)	62-73-7	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Dimethoate	60-51-5	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Disulfoton	298-04-4	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
EPN	2104-64-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Ethion	563-12-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Ethoprop	13194-78-4	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Fensulfothion	115-90-2	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Fenthion	55-38-9	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Malathion	121-75-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Merphos	150-50-5	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Mevinphos	7786-34-7	Yes	0.1 UJ - 0.12 UJ	0.1 UJ
Monocrotophos	6923-22-4	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Naled	300-76-5	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Parathion, ethyl	56-38-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Parathion, methyl	298-00-0	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Phorate	298-02-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Ronnel	299-84-3	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Sulfotepp	3689-24-5	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
Sulprofos	35400-43-2	Yes	0.05 UJ - 0.06 UJ	0.05 UJ
TEPP	21646-99-1	Yes	0.21 UJ - 0.24 UJ	0.21 UJ
Tetrachlorvinphos	22248-79-9	Yes	0.26 UJ - 0.31 UJ	0.26 UJ
Trichloronate	327-98-0	Yes	0.05 UJ - 0.06 UJ	0.05 UJ

U Compound was analyzed for but not detected at the stated limit.

J Indicates an estimated value.

4.1.4 Dioxins and Furans

Some Phase 3 soil samples were submitted for the analysis of total tetra through octa dioxin and furan homologs. These highly specialized analyses were planned for the first few samples from each of the vadose zone boreholes. Evidence has shown that dioxins do not readily migrate through soil and dioxins are not suspected to have been disposed of at the site. Sampling and analysis was intended to demonstrate that the vadose zone was not contaminated with such compounds.

Samples were analyzed using a modified version of SW-846 Method 8280, (Rev. 0) (EPA 1986). Dioxin analyses, like organophosphorous pesticide analyses, were subcontracted by the primary laboratory. A 10-g aliquot of each sample and laboratory blank (sodium sulfate) were spiked at the analytical laboratory before extraction with an internal standard solution containing 50 ng each of ^{13}C -2,3,7,8-TCDD, ^{13}C -2,3,7,8-TCDF, ^{13}C -PeCDD, ^{13}C -PeCDF, ^{13}C -HxCDD, ^{13}C -HxCDF, ^{13}C -HpCDD, ^{13}C -HpCDF and ^{13}C -OCDD. A summary of the performance against these internal standards is shown in Table 4-5.

Table 4-5. Internal Standard Percent-Recovery Summary
Dioxins and Furans (25 Samples).

	TCDD	PeCDD	HxCDD	HpCDD	OCDD	TCDF	PeCDF	HxCDF	HpCDF
AVERAGE	65.08	66.56	68.08	59.8	63.48	59.72	62.8	79.72	72.76
RANGE- Max	84	98	85	71	98	83	84	103	92
Min	37	36	44	43	44	26	49	61	55

Additional laboratory QC included blank, matrix spike, and duplicate analyses. Results were within established acceptance limits.

All soil aliquots were extracted outside the 7-day criterion applicable to certain water samples. Results shown in Appendix A were conservatively qualified "UJ" by Westinghouse Hanford because of the time between field sampling and extraction. Periods between sampling and extraction ranged from 3 weeks to 50 days. Once extracted, all samples were analyzed within the 40-day criterion established for extracts.

Detection limits were calculated and reported by the laboratory when target compounds were not found. The concentration corresponding to a signal-to-noise ratio of 2.5 was reported as the detection limit for each analyte. All results reflect these limits and are reported with "U" qualifiers in Appendix A.

The result for sample B00H01 (see Section 4.1) is missing; however, this should have minimal impact on the chemical characterization of 3C Pond vadose zone. Samples taken above and below B00H01 were not found to have any detectable dioxin or furan target compounds. (This is also consistent with samples from other areas of B-Pond.)

4.1.5 Volatile Organic Compounds

No volatile organic compounds of significance were found. However, three identifiable compounds were reported in the regular samples: methylene chloride, acetone, and 4-methyl-2-pentanone. Only methylene chloride is known to be a 40 CFR Part 261 Hazardous Constituent and WAC 173-303-9905 Dangerous Waste Constituent. All regular, field duplicate, field split, and silica sand sample results are shown in Appendix A.

Traces of three unidentified compounds were reported in sample B00GV5. This was the deepest 3A Pond borehole sample (~143.5 ft). It was from a saturated zone. (The sample was noted as "very wet" in the field logbook. A percent moisture on the VOA aliquot was not reported.)

Samples were spiked with surrogate compounds to monitor method performance. Recoveries are summarized in Table 4-6. Performance on matrix spike and matrix spike duplicates was also reviewed as part of data validation and found to be within accepted limits. Some VOA results were qualified during data validation based on holding times and laboratory reagent blanks.

Table 4-6. VOA Surrogate Percent-Recovery Summary
(37 Samples--50 $\mu\text{g/Kg}$ Spikes)

SURROGATE	QC LIMITS (%)	MEAN (%)	MAXIMUM (%)	MINIMUM (%)
Toluene-d8	81-117	103.4	115.4	91.2
Bromofluorobenzene	74-121	101.1	109.2	91.0
1,2-Dichloroethane	70-121	102.0	110.7	86.9

Methylene chloride was reported in B00FK7 (4 J $\mu\text{g/Kg}$) and B00FK8 (3 J $\mu\text{g/Kg}$). These were the second and third samples, respectively, collected from the 3A Pond borehole. No other suspected traces of this analyte were identified in the 29 other regular site samples, 3 field duplicates, 3 silica sand samples, or 9 laboratory reagent blanks. Methylene chloride in each sample was reported at less than the minimum detection level reported for all other samples. Reporting limits on other samples ranged from 5 U - 8 U $\mu\text{g/Kg}$, with 5 U $\mu\text{g/Kg}$ being the most common value.

Methylene chloride was reported by the laboratory (before Westinghouse Hanford validation) with a "J" qualifier flag. This indicates an estimated value. According to CLP protocol and given evidence of detection, some analytes may be reported by the laboratory at levels below the CLP contract detection limit and flagged as estimated. The EPA CLP Statement of Work for Organic Analysis has historically used 10 $\mu\text{g/Kg}$ as a contract-required quantitation limit (CRQL) for methylene chloride in soil. This figure is based on wet weight, and must be adjusted upward based on the percent moisture for comparison to results reported on a dry-weight basis. The reporting methods used by the Phase 3 laboratories are based on this protocol. Results were reported on a dry-weight basis.

Although methylene chloride was not reported in blanks, it is a common laboratory contaminant. It can also diffuse through the septum of VOA sample containers in shipment or storage. Acetone, another common volatile solvent,

was also reported in each of the two samples reported with traces of methylene chloride. These samples contained the highest and second highest reported levels of acetone.

Acetone was reported in only 6 of the 37 validated VOA samples analyzed at the primary laboratory. Reported concentrations were 64, 55, 13, 17, 27, and 49 $\mu\text{g/Kg}$. Five of the incidences were associated with two sampling/shipment days (from 3A Pond) and two analytical batches. Sample numbers were B00FK7, B00FK8, B00FL0, B00FL3 (silica sand blank), and B00GR9 (field duplicate). The sixth occurrence was in sample B00H19 from 3C Pond. Not all samples collected and shipped in common were analyzed on the same day. Eight samples shared the characteristic of having been collected/shipped and analyzed in association with a sample where acetone was reported. None of the three immediately associated laboratory blanks showed traces of acetone, although another laboratory blank during the project was reported at 26 $\mu\text{g/Kg}$. One of the eight samples was a silica sand field blank. Acetone was reported in the silica sand blank at 17 $\mu\text{g/Kg}$. The other two silica blanks submitted during the project were not reported to contain acetone. Acetone was also not reported in B00FL4, the regular sample associated with the field duplicate, B00GR9.

All individual sample results for acetone are less than four times the amount reported in one of the three project silica sand blanks. All acetone results are also below the SW-846 (EPA 1986) practical quantitation limit (PQL) discussed below. Acetone is highly soluble in water. If acetone was at a quantifiable concentration and originated from percolating wastewater, there should be a positive correlation between sample moisture and acetone content. The evidence does not support correlation.

The compound 4-methyl-2-pentanone, also known as methyl isobutyl ketone, was reported by the laboratory at 3 J $\mu\text{g/Kg}$ in sample B00GV5, B00GX6, and B00GZ2. (The "J" qualifiers have the same meaning as for methylene chloride.) The contract-required quantitation limit (CRQL) and nominal reporting limit of 4-methyl-2-pentanone is the same as methylene chloride, 10 $\mu\text{g/Kg}$. For all other 28 regular samples, 3 field duplicates, and 3 silica sand blanks, 4-methyl-2-pentanone was reported as undetected at the adjusted CRQL. Although not reported in either of the two immediately associated laboratory blanks, the compound was reported at precisely the same concentration in one of the nine laboratory VOA blanks reported for the project. This rate of occurrence (as well as concentration) is not significantly different from that found for site soil samples. A related compound, the aldol condensate 4-hydroxy-4-methyl-2-pentanone, was a chronic contaminant in semivolatile analyses at the primary laboratory. (All occurrences of that compound were qualified as undetected TICs caused by prolific laboratory contamination. Because of this they are not shown in Appendix A, but concentrations frequently exceeded 20,000 $\mu\text{g/Kg}$ in many semivolatile analyses.)

The validation procedure used to produce the data listed in Appendix A qualifies data based only on laboratory blanks. Appendix A data have not been qualified based on results of project silica sand field samples. Consistent with EPA validation guidance, the procedure employed to evaluate laboratory blanks uses a 10X rule for evaluating common laboratory contaminants, including acetone. Results less than 10X the concentration in an associated blank are qualified as undetected at the reported concentration.

Frequently instrument capabilities alone are not the primary limitation of measuring low-level organic compounds. Other aspects of the procedure, such as sample preparation and handling, are important parts of the measurement system. For instance, a single VOA aliquot of sample B00H19 was collected and shipped for analysis. It was divided by the laboratory and analyzed in triplicate as a regular, matrix spike, and matrix spike duplicate sample. Acetone was measured at 49 and 47 $\mu\text{g/Kg}$ respectively in two portions, yet undetectable (11 U $\mu\text{g/Kg}$) in the third.

In recognition of such factors, EPA has established practical quantitation limits (PQLs) for those methods used to determine whether a solid waste is a hazardous waste within the definition of Section 3001 of RCRA. Practical quantitation limits are estimates of the lowest concentrations that can be reliably measured by a given analytical procedure. Washington State "Dangerous Waste Regulations" (WAC 173-303) reference EPA's SW-846 (EPA 1986) manual in setting analytical protocol standards. The EPA has published 5 $\mu\text{g/Kg}$ as a PQL for methylene chloride in soil measured by SW-846 method 8240. The corresponding PQLs for acetone and 4-methyl-2-pentanone are 100 and 50 $\mu\text{g/Kg}$ (EPA 1986). EPA recognizes that PQLs are highly matrix dependent and may not always be achievable. Again, these figures are based on wet weight and must be adjusted when compared to results reported on a dry-weight basis.

Although not currently discussed in the "Dangerous Waste Regulations" (WAC 173-303), regulations under other authority such as Washington State's "Model Toxics Control Act" (WAC 173-340) reference EPA's PQLs in establishing de facto de minimis regulatory limits (see WAC 173-340-707 *Analytical Considerations*). Other factors, including toxicity, are also considered.

The EPA is not known to have issued any general rules on environmental media de minimis levels of 40 CFR Part 261 Appendix VIII hazardous constituents. It has historically been EPA's policy that such levels are determined on a site-specific basis (57 FR 958 et seq.). The EPA's proposed RCRA Corrective Action rules (55 FR 30798 et seq.) give an example of a soil methylene chloride concentration meeting the criteria for a media action level. This action level is a conservative health-based level based on ingestion of contaminated soil. The toxicity of methylene chloride is such that the proposed action level is 90 mg/Kg (equivalent to 90,000 $\mu\text{g/Kg}$). Likewise, conservative health-based concentration action levels for acetone and 4-methyl-2-pentanone are 8000 mg/Kg and 4000 mg/Kg, respectively.

4.1.6 Base/Neutral/Acid Compounds

Phase 3 soil samples showed no semivolatile target compounds at concentrations above their respective CRQL. Only two target compounds were reported in site samples, benzoic acid and diethylphthalate. Each occurrence was qualified as estimated, "J", by the laboratory because both had less than CRQL concentrations. Both were also reported in at least one laboratory blank, although not the one "associated" with those particular analyses according to the employed data validation procedure. All regular, field duplicate, field split, and silica sand sample results are shown in Appendix A.

Surrogate compounds were used to monitor method performance. All surrogate recoveries were within acceptable limits. A performance summary for

all regular, duplicate, and silica sand samples submitted to the primary laboratory is shown in Table 4-7. All matrix spike and duplicate recoveries met QC specifications.

Table 4-7. Semivolatile Surrogate Percent-Recovery Summary
(37 Primary Laboratory Samples).

Surrogate	Nitrobenzene -d5	1,1'-Biphenyl, 2-Fluoro	Terphenyl-d14	Phenol-d6	2-Fluoro phenol	2,4,6-Tribromo phenol
Spike added ($\mu\text{g/Kg}$)	100	100	100	200	200	200
Mean percent- recovery	57.2	65.8	83.1	54.6	51.8	52.2
Standard deviation	17.2	20.4	14.8	16.1	13.3	17.4
QC Limits %	23 - 120	30 - 115	18 - 137	24 - 113	25 - 121	19 - 122

While benzoic acid is not listed as a RCRA Appendix VIII- or WAC 173-303-9905 Dangerous Waste constituent, benzoic acid was reported in 9 of the 37 samples, (regular, field duplicate, and silica sand samples). In each case, it was reported at less-than-one-fifth of the nominal less-than-reporting limit of 5000 $\mu\text{g/Kg}$. Seven occurrences were associated with samples extracted February 24, 1991. All of the samples were from the upper 28 ft of the 3A Pond borehole. The remaining two occurrences were associated with samples extracted March 7, 1991. These were the first two samples from the 3B borehole. Neither immediately associated batch blank was reported with traces of benzoic acid, nor were other site samples in the batches. However, one of seven laboratory blanks reported with Phase 3 samples did contain benzoic acid, estimated at 1500 J $\mu\text{g/Kg}$, which is below the CRQL. This concentration is greater than that estimated in the nine validated samples.

Diethylphthalate was reported in only three regular samples and one split sample. Diethylphthalate appears on both the RCRA Appendix VIII and WAC 173-303-9905 list. All occurrences of diethylphthalate were qualified as estimated, flagged with a "J", because of low concentration. All occurrences were less than half the less-than-reporting limit of 1000 $\mu\text{g/Kg}$. Reported concentrations were 170 J, 210 J, and 370 J $\mu\text{g/Kg}$. One of the independently analyzed split samples was reported at 95 J $\mu\text{g/Kg}$. That sample was collected simultaneously to with the regular sample reported at 210 J $\mu\text{g/Kg}$ by the primary laboratory. Sample numbers and location are as follows:

- B00FK7 (3A Pond-8.5 ft)
- B00GS4 (3A Pond-52.5 ft)
- B00GZ2 (3B Pond-90.5 ft)
- Split B00GS5 (3A Pond-52.5 ft).

No evidence of the phthalate compound was found in the associated laboratory blanks; however traces were suspected in two of the seven blanks at the primary laboratory, (a higher rate than the samples). The phthalate compound was reported at 670 J and 540 J $\mu\text{g/Kg}$ in those laboratory reagent blanks. As a result, some samples were qualified undetected at the CRQL. None of the three split laboratory blanks or three silica sand samples showed traces of this particular phthalate, though both groups contained other

phthalates. Phthalates are commonly found at low levels as field or laboratory contaminants.

The EPA CLP SOW for organic analyses has traditionally defined an acceptable semivolatile analytical method blank as one containing a concentration less than or equal to the CLP CRQL, except for target compound phthalate esters. An acceptable blank may contain a concentration of less than or equal to 5X times the target compound phthalates. This reflects the widespread use of phthalate compounds and the difficulty of avoiding sample cross-contamination bias. The key issue of whether a particular single isolated sample is representative must be considered.

The fact that both the regular sample, B00GS4, and its associated split, B00GS5 were reported with traces of diethylphthalate suggests at least some of the occurrences may have had a field origin (true or artificial). Although the compound sinks in water, phthalate esters are readily sequestered by or adsorbed on organic residues and solid surfaces in environmental water systems. This should lead to accumulation in the near-surface sediments and subsequent long-term low-level release if wastewater disposal activities are the true source of diethylphthalate. Introduced spurious contamination from a common field source is also a possible source, which would cause such samples to actually be unrepresentative of site conditions.

The few and isolated nature of the occurrences, low concentration, and apparent lack of decreasing concentration with depth suggest that the occurrences are an artifact of the measurement system and not a reflection of site conditions. Although trends with depth are opposite of a pond sediment source, the values are too low to be considered reliable indicators of contamination. The overall measurement system is simply not capable of reliably characterizing the mean diethylphthalate concentration at such minute levels. From a single split spoon of soil, the sample standard deviation calculated using the two independently analyzed samples, B00GS4 and B00GS5, is 81.3 $\mu\text{g/Kg}$. A 90-percent one-sided small sample confidence interval for the true mean of the location encompasses zero. Based only on the demonstrated reproducibility at this one location for which two, supposedly positive, independent analyses were performed, one cannot reliably consider the concentration of diethylphthalate different from zero.

Semivolatile results, in contrast to the Phase 1 study results, showed frequent TICs, averaging approximately 13 per sample for the primary laboratory and slightly more than 3 per sample for the split laboratory. In addition, laboratory batch blanks averaged approximately 14 TICs per blank at the primary laboratory; no TICs were seen for blanks at the split laboratory. Most of the TICs were either unidentifiable or only generically identifiable compounds. The large number of TICs reported by the primary laboratory for both samples and blanks suggest that their occurrence must be interpreted with some skepticism.

The majority of TICs were rejected on validation because identical compounds occurred at similar concentrations in the immediately associated laboratory batch blanks. Nevertheless, some TICs remained after validation. A surprisingly similar number of TICs were present in the average validated sample results from the primary and split laboratories--slightly less than four and slightly greater than three, respectively, after validation. Silica sand field blanks were not considered in the employed validation procedure.

They were submitted only to the primary laboratory. On average, they contained four validated TICs per sample.

One compound identified as a validated TIC is listed on the RCRA Appendix VIII or WAC 173-303-9905 Dangerous Waste Constituents List. The identified compound is dimethylhydrazine (CAS # not reported by laboratory). Three occurrences, (B00FL1, B00GR9, and B00FK9), were associated with a single analytical batch; however, B00FK9 was flagged to indicate the analyte was found in an associated laboratory reagent blank. The laboratory did not specifically report this compound in the identified associated laboratory blank, (lab ID 910225-170). The laboratory has not been able to produce a definitive explanation for this apparent anomaly. Application of validation criteria to TICs resulted in rejection of this particular TIC in sample B00FK9, but not B00FL1 or B00GR9--even though all were supposedly in the same analytical batch. Reported concentrations and qualifiers were 600 JY- and 460 J- μ g/Kg, respectively. No other Phase 3 samples contained this compound.

4.2 INORGANIC CHEMICAL RESULTS

All inorganic results with attached data qualifiers are listed in Appendix A. The results are summarized by two tables. Calculated statistics can be confirmed using values listed in Appendix A. Further comparisons of these results are made in Section 5.

All regular samples are summarized in Table 4-8. Values are summarized by showing the total number of samples analyzed, number of less-than-detection-limit values, median, mean, upper 90-percent limit of the mean, standard deviation, percent coefficient of variation, and range for each lobe. A standard deviation, upper confidence limit, and percent-coefficient of variation were not calculated for analytes that were rarely or never at detectable concentrations. For those analytes that were undetected in a minority of samples, analytes were assumed, for summary calculation purposes, to have values equal to their reported "less-than" values. Concentration qualification flags are shown for the minimum and maximum values of each lobe.

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Aluminum	3A	20	0	6100	6160	6584	1427	23	3800	9600
	3B	20	0	6000	6975	7866	3001	43	4500	17000
	3C	15	0	6000	5987	6333	998	17	4600	8300
Ammonia	3A	21	21	<0.001	<0.001	NC	NC	NC	0.001 U	0.001 U
	3B	17	17	<0.001	<0.001	NC	NC	NC	0.001 U	0.001 U
	3C	15	15	<0.001	<0.001	NC	NC	NC	0.001 U	0.001 U
Antimony	3A	20	16	<5.2	<5.8	NC	NC	NC	4.6 U	14
	3B	20	20	<5.1	<5.1	NC	NC	NC	4.9 U	5.8 U
	3C	15	15	<5.2	<5.2	NC	NC	NC	4.8 U	5.3 U
Arsenic	3A	21	0	1.5	1.74	1.97	0.805	46	0.79	4.2
	3B	20	1	<1.35	<2.25	2.90	2.171	96	0.59 U	7.2
	3C	11	0	1.7	1.46	1.76	0.713	49	0.65	2.5
Barium	3A	20	0	71.5	71.1	74.1	10.2	14	53	91
	3B	20	0	78	77.6	80.7	10.4	13	62	96
	3C	15	0	73	80.5	90.6	29.3	36	50	170
Beryllium	3A	20	0	0.35	0.36	0.38	0.073	20	0.23	0.53
	3B	20	0	0.35	0.38	0.42	0.130	34	0.29	0.88
	3C	15	0	0.30	0.31	0.33	0.058	19	0.21	0.41
Boron	3A	20	6	<4.6	<4.52	5.55	3.46	77	0.39 U	9.3
	3B	20	0	7.0	6.99	7.57	1.98	28	3.7	12
	3C	15	2	<7.7	<7.37	8.89	4.38	59	0.42 U	14

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Cadmium	3A	20	4	<0.66	<0.78	0.90	0.42	54	0.28 U	1.6
	3B	20	1	<0.98	<1.06	1.19	0.44	41	0.31 U	1.8
	3C	15	0	1.7	1.72	1.89	0.50	29	1.0	2.5
Calcium	3A	20	0	8000	8305	9055	2524	30	3400	14000
	3B	20	0	7250	7415	7994	1949	26	3000	13000
	3C	15	0	6800	7193	7686	1419	20	5300	11000
Chloride	3A	21	21	<20	<18.2	NC	NC	NC	1 U	20 U
	3B	20	20	<20	<20	NC	NC	NC	20 U	20 U
	3C	15	15	<20	<20	NC	NC	NC	20 U	20 U
Chromium	3A	20	0	7.55	8.17	9.35	3.98	49	3.1	16
	3B	20	0	10.35	12.0	13.6	5.39	45	5.1	25
	3C	15	0	7.30	9.23	11.2	5.64	61	4.1	27
Cobalt	3A	20	0	11	12.0	12.6	2.04	17	7.0	15
	3B	20	0	13	12.2	12.8	2.07	17	7.3	15
	3C	15	0	13	12.4	13.1	1.94	16	8.1	16
Copper	3A	20	0	16	18.3	20.5	7.31	40	10	45
	3B	20	0	19	19.4	20.7	4.44	23	13	33
	3C	15	0	17	17.4	18.6	3.40	20	13	26
Cyanide	3A	11	10	<1	<0.9	NC	NC	NC	0.12 J	1 UJ
	3B	11	11	<1	<0.7	NC	NC	NC	0.1 UJ	1 UJ
	3C	9	8	<0.1	<0.4	NC	NC	NC	0.1 UJ	1 UJ

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Fluoride	3A	21	9	<2	<1.5	NC	NC	NC	0.6	2.2
	3B	20	13	<2	<2.1	NC	NC	NC	2 U	3
	3C	15	12	<2	<2.0	NC	NC	NC	2 U	2.2
Iron	3A	20	0	26000	24700	2.58E+04	3813	15	16000 J	29000
	3B	20	0	26000	25500	2.65E+04	3269	13	17000	30000 J
	3C	15	0	25000	25200	2.64E+04	3590	14	17000	31000
Lead	3A	21	0	3.83	4.89	5.97	3.722	76	2.1	18
	3B	20	0	3.15	5.24	6.58	4.535	87	2.2	20
	3C	11	0	2.5	4.99	8.43	8.316	167	1.8	30
Magnesium	3A	20	0	4900	5035	5385	1178	23	3800	8700
	3B	20	0	4500	4785	5142	1201	25	3600	8400
	3C	15	0	4500	4513	4711	569	13	3700	5800
Manganese	3A	20	0	340	334	350	54.3	16	250 J	440
	3B	20	0	310	322	335	42.5	13	270	410 J
	3C	15	0	300	313	329	44.3	14	250	400
Mercury	3A	21	21	<1.0	<1.0	NC	NC	NC	1.0 U	1.0 U
	3B	20	20	<1.0	<1.0	NC	NC	NC	1.0 U	1.0 U
	3C	7	7	<1.0	<1.0	NC	NC	NC	1.0 U	1.0 U
Molybdenum	3A	20	15	<1.05	<1.18	NC	NC	NC	0.96 U	2.4
	3B	20	8	<1.2	<1.25	1.34	0.30	24	0.99 U	2.0
	3C	15	11	<1.0	<1.18	NC	NC	NC	0.97 U	2.2

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Nickel	3A	20	0	10	10.9	12.2	4.26	39	5.9	24
	3B	20	0	11	11.3	12.2	3.01	27	8.2	21
	3C	15	0	10	10.6	11.6	2.87	27	6.8	18
Nitrate	3A	21	21	<20	<18.2	NC	NC	NC	1 UJ	20 UJ
	3B	20	20	<20	<20	NC	NC	NC	20 UJ	20 UJ
	3C	15	15	<20	<20	NC	NC	NC	20 UJ	20 UJ
pH (Field)	3A	21	0	7.	7.0	7.2	0.42	6	6	7.6
	3B	20	0	7.5	7.3	7.4	0.30	4	7	8
	3C	15	0	7.5	7.5	7.6	0.40	5	7	8.1
Potassium	3A	20	0	820	905	1007	345	38	530	1800
	3B	20	0	780	1013	1181	566	56	660	3000
	3C	15	0	860	863	925	179	21	550	1100
Selenium	3A	12	12	<0.54	<0.70	NC	NC	NC	0.49 U	1.1 UD
	3B	11	11	<0.52	<0.53	NC	NC	NC	0.50 U	0.61 U
	3C	6	6	<0.52	<0.52	NC	NC	NC	0.51 U	0.52 U
Silicon	3A	20	0	445	437.0	478	137	31	270	860
	3B	20	0	300	326.5	347	70	21	240	450
	3C	15	0	300	326.7	349	66	20	250	460
Silver	3A	20	12	<0.64	<0.75	NC	NC	NC	0.56 U	1.5
	3B	20	20	<0.61	<0.62	NC	NC	NC	0.58 U	0.70 U
	3C	15	15	<0.62	<0.62	NC	NC	NC	0.58 U	0.64 U

Table 4-8. Summary Statistics--Regular Samples (µg/g). (5 sheets)

Analyte	Pond	Number of Samples		Median	Mean	Upper 90% Limit	Standard Deviation	Percent Coefficient of Variation	Range	
		Total	< Detection Limit						Minimum	Maximum
Sodium	3A	20	0	280	349	404	186	53	170	810
	3B	20	0	405	402	445	146	36	180	710
	3C	15	0	435	479	520	117	24	270	730
Sulfate	3A	21	2	<20	<18.4	NC	NC	NC	1 U	24
	3B	20	5	<20	<22.7	NC	NC	NC	20 U	39
	3C	15	1	<20	<20.4	NC	NC	NC	20 U	26
Sulfide	3A	11	11	<0.1	<0.1	NC	NC	NC	0.1 U	0.1 U
	3B	11	10	<0.1	<0.1	NC	NC	NC	0.1 U	0.1
	3C	9	9	<0.1	<0.1	NC	NC	NC	0.1 U	0.1 U
Thallium	3A	12	12	<1.0	<1.04	NC	NC	NC	0.97 U	1.1 U
	3B	11	11	<1.0	<1.04	NC	NC	NC	1.0 U	1.2 U
	3C	6	6	<1.0	<1.00	NC	NC	NC	1.0 U	1.0 U
Vanadium	3A	20	0	67.5	64.5	68.4	13.3	21	38	86
	3B	20	0	70.5	66.2	70.6	14.9	22	34	87
	3C	15	0	68	66.9	71.1	12.1	18	38	85
Zinc	3A	20	0	49.5	47.8	49.8	6.64	14	34	60
	3B	20	0	47	46.6	47.9	4.67	10	39	56
	3C	15	0	47	46.3	48.5	6.50	14	34	57

NC Not calculated, most or all values undetected. See Appendix A data.
D Dilution.
U Analyte was not detected at the stated limit.
J The associated value is an estimated quantity.

Field duplicates are summarized in Table 4-9. Field duplicate samples aid in evaluating short-term variability of the measurement system processes and of the inherent media variability itself. They provide a second estimate of the representative concentration associated with a particular interval, and thereby allow an estimate of variability within the given measurement system. For the purposes of the Table 4-9 summary, all statistics were calculated only where pairs of values were uncensored by a reporting limit. The following two methods of summarizing variability were used:

- The average sample variance between regular/field duplicate pairs. (The square root of the variance is the standard deviation.)
- The average percent coefficient of variation between regular/field duplicate pairs.

Variability above the detection limit is also graphically displayed in Appendix B for regular/field duplicate and regular/split sample pairs uncensored by a reporting limit. Most analytes show no definitive trend between variability and concentration for results from a single laboratory; however, this is not the case when split samples are considered. This suggests that the coefficient of variation may be the preferred parameter to consider when making interlaboratory comparisons. These comparisons incorporate sources of variability between measurement systems as well as within single-laboratory systems.

Split samples provide an independent analysis to corroborate results of the primary laboratory. Table 4-9 summarizes the average "bias" of the reportable primary laboratory results by assuming that the split laboratory provides the true value. The standard deviation of the bias and number of pairs considered in the calculations are listed. The statistical significance was evaluated by determining if a 95%, two-sided confidence interval around the average also encompassed zero. The interval was based upon the t-distribution, number of bias estimates and their variability. Analyte concentrations were generally lower at the split laboratory than the primary laboratory. Therefore, decisions based on projections from the primary laboratory values should be more conservative and thus be more protective of human health and the environment. If the site is considered sufficiently clean based on these higher values, overestimation of constituents is irrelevant. However, if values suggest that dangerous waste is be present, further evaluation may be in order.

A mean bias and comparison calculations were not made when all values were reported at an undetected censored limit by either laboratory. When values were not censored at a reporting limit, they were considered in the comparisons. Alternatively for arsenic, beryllium, chromium, potassium, sodium, and gross alpha, computations were also made considering all censored concentrations equivalent to the reporting limit, (example $1.0 \text{ U} = 1$). The alternate results are shown in brackets. In the case of sodium, one undetected split was reported at a much higher limit and therefore unduly affected this type of comparison. No comparisons are possible for analytes not measured at both the primary and split laboratories.

Table 4-9. Field Duplicate and Split Comparison Summary^a

Analyte (µg/g)	Field Duplicate: Regular Sample Pairs				Regular Minus Associated Field Split Sample			
	Computed on x Sample Pairs	Average Variance (S ²)	Standard Deviation (S)	Average Percent Coefficient of Variation	Mean Bias µg/g	Standard Deviation of Bias	Computed on x Sample Pairs	Statistically Significant? (α=.05)
Aluminum	7	250714.3	500.71	6.50	4082.86	1163.50	7	Y
Ammonia	-	NC	NC	NC	NA	NA	-	-
Antimony	-	NC	NC	NC	NC	NC	-	-
Arsenic	6	1.503	1.226	19.9	1.426 [1.14]	2.37 [2.04]	5 [7]	N [N]
Barium	7	126.6	11.25	11.4	28.4429	13.33	7	Y
Beryllium	7	0.0	0.02	6.20	0.07 [-0.04]	0.11 [0.31]	4 [7]	N [N]
Boron	6	1.7	1.32	10.6	NA	NA	-	-
Cadmium	7	0.3	0.51	26.8	NC	NC	-	-
Calcium	7	1465714.3	1210.67	11.4	2761.43	978.48	7	Y
Chloride	-	NC	NC	NC	NA	NA	-	-
Chromium	7	12.4	3.52	27.3	14.17 [11.04]	6.17 [5.50]	3 [7]	N [Y]
Cobalt	7	0.2	0.48	3.09	5.25	2.74	6	Y
Copper	7	3.4	1.85	9.01	9.943	3.25	7	Y
Cyanide	-	NC	NC	NC	NC	NC	-	-
Field pH	7	0.0	0.0	0.0	NA	NA	-	-
Fluoride	-	NC	NC	NC	NA	NA	-	-
Iron	7	2214285.7	1488.05	4.34	14927.1	3962.73	7	Y
Lead	7	8.995	2.999	12.2	2.2	5.45	6	N
Magnesium	7	189285.7	435.07	8.85	2645.71	816.37	7	Y
Manganese	7	464.3	21.55	5.38	145.6	48.27	7	Y
Mercury	-	NC	NC	NC	NC	NC	-	-
Molybdenum	3	0.3	0.57	31.5	NA	NA	-	-
Nickel	7	26.9	5.18	20.3	5.62	2.43	6	Y
Nitrate	-	NC	NC	NC	NA	NA	-	-
Potassium	7	8114.3	90.08	8.76	389.75 [351.28]	74.59 [205.7]	4 [7]	Y [Y]
Selenium	-	NC	NC	NC	NC	NC	-	-
Silicon	7	3828.6	61.88	12.9	NA	NA	-	-

Table 4-9. Field Duplicate and Split Comparison Summary^a

Analyte ($\mu\text{g/g}$)	Field Duplicate: Regular Sample Pairs				Regular Minus Associated Field Split Sample			
	Computed on x Sample Pairs	Average Variance (S^2)	Standard Deviation (S)	Average Percent Coefficient of Variation	Mean Bias $\mu\text{g/g}$	Standard Deviation of Bias	Computed on x Sample Pairs	Statistically Significant? ($\alpha=.05$)
Silver	-	NC	NC	NC	NC	NC	-	-
Sodium	7	3785.7	61.53	11.6	272.14 [151.1]	177.58 [299.35]	5 [7]	Y [N]
Sulfate	2	18.5	4.30	13.3	NA	NA	-	-
Sulfide	-	NC	NC	NC	NA	NA	-	-
Thallium	-	NC	NC	NC	NC	NC	-	-
Vanadium	7	13.0	3.61	4.17	45.029	14.53	7	Y
Zinc	7	8.6	2.93	4.32	25.829	5.35	7	Y
RADIONUCLIDE DATA ($\mu\text{Ci/g}$)								
Gross Alpha	7	1.21	1.100	NC	-2.7 [-1.4]	1.38 [1.7]	3 [6]	N [N]
Gross Beta	7	18.78	4.334	NC	-18.35	12.88	6	Y
Strontium-90	3	1.60	1.263	NC	NC	NC	-	-
Gamma: Cs-137	2	0.015	0.121	NC	NA	NA	-	-
Gamma: Pa-234m	2	1056.25	32.500	NC	NA	NA	-	-
Gamma: Th-234	2	1.49	1.220	NC	NA	NA	-	-

^a "U" flagged, less-than values excluded except for bracketed alternate figures computed under the assumption undetected values are equal to the reporting limit, (See text).

NC Not calculated, most or all values undetected--see Appendix A data.

NA Not available.

4.3 RADIOANALYTICAL RESULTS

Radioanalytical work included field screening techniques and both onsite and offsite laboratory determinations. All samples were handled as nonradioactive based on field screening and onsite analyses. Offsite analyses included gross alpha, gross beta, gamma, and ^{90}Sr determinations. The primary laboratory reported EPA 900.0 was used for alpha, beta and gamma, and EPA 906 for ^{90}Sr determinations. Several samples were submitted to the split laboratory for radiologic analyses. These particular analyses were subcontracted to another laboratory. Methods were identified only by the laboratory-specific procedure numbers PRO-032-15 for total alpha or beta determinations, PRO-042-5 for gamma scans, and PRO-032-25 for strontium-90 assays.

The above parameters are not believed to be regulated under current and applicable RCRA regulations. Unvalidated radiological data are presented in Appendix A for information only. Field duplicate and split summaries are presented at the end of Table 4-9. The results of the gamma spectra analyses were not comparable between the two project laboratories. Different radionuclides were reported by the two measurement systems.

Gross gamma borehole logging did not reveal any obvious anomalies. Without radionuclide-specific detection capabilities, it is not possible to judge whether any areas of slightly elevated gross counts are caused by radionuclide contamination or localized natural background differences.

4.4 GEOLOGY AT THE VADOSE BOREHOLES

The geology at the three boreholes consisted of mixed sands, sandy gravels, and gravelly sands typical of the Hanford formation in this area. Lithologic descriptions of the three boreholes were recorded in the project borehole logs. A general classification associated with each sample has been listed in the sample key, Table 3-4.

Soil from the 3A Pond borehole was somewhat sandier and had less gravels than soil from the other locations reflecting the fining westward character of the Hanford formation in the B-Pond area. The water table at the 3A Pond borehole was in a sandy gravel, probably still in the Hanford formation, while at the 3B Pond borehole, a saturated silt lens at 116.5 ft most likely marks the top of the Ringold formation. The 3C Pond borehole did not penetrate deep enough to pass through the Hanford formation into the Ringold, which also underlies this area.

Undisturbed surface soil surrounding the B-Pond system is predominately eolian-deposited material. It lacks the cobble and coarse gravels common to the flood-deposited Hanford formation. Earlier Phase I sampling collected one class of background samples from the upper foot of soil in sagebrush areas surrounding the B-Pond system. Other background samples collected, as part of the same study, were from the surface of an adjacent unused contingency pond excavation. These two groups of samples were treated separately in the Phase I analysis when it became evident that the values of the combined set differed significantly from a normal distribution.

4.5 SOIL PHYSICAL PROPERTIES

Characterization work at the three boreholes included a suite of physical properties testing. Samples collected for physical properties testing were not those analyzed for chemical constituents. Testing was performed at an onsite laboratory. Determinations included specific gravity, percent moisture content, grain size distribution by sieve analysis, hydraulic conductivity, and porosity. Deviation from basic theoretical relationships showed moisture retention curve results were not satisfactory.

Six samples were collected from the borehole at the 3A Pond; 11 at the 3B Pond; and 3 at the 3C Pond. Test requests were not the same for each sample, particularly where similar lithologies were present at several sample horizons. Table 4-10 shows physical properties data for the three boreholes. Some determinations were not performed because the samples were unsuitable. Table 4-11 shows sieve data results. A hydrometer analysis was performed for most samples on fractions passing through a number 200 sieve. This additional data was not included in Table 4-11.

Specific gravity of all samples was well within expected values, ranging from 2.69 to 2.82 g/cm³. Sieve analysis data showed grain size distributions typical of the Hanford formation in this area. Most samples were classified as sandy gravels and were poorly sorted showing a fairly wide range in grain size. Porosity ranged from 20.50 to 37.71 percent. These values are relatively high, but well within the range for the sandy gravels of the Hanford formation, which are relatively uncompacted and uncemented.

Moisture content varied widely between physical property samples and was not correlated with depth of the sample. Moisture contents of 15 to 18 percent in the 3A Pond borehole indicate saturated or nearly saturated sediments at intermediate depths. This borehole was drilled over a filled area on the edge of the 3A Pond. At the 3B Pond borehole, moisture contents were generally lower, between 2.44 and 7.16 percent above the water table and 20.88 percent in the sample taken at the water table. The 3B Pond has not been used for wastewater disposal since 1985. Moisture content in physical samples from the 3C Pond borehole ranged from 1.07 to 9.6 percent.

Hydraulic conductivity values determined in the laboratory reflect the generally coarsening grain size of the Hanford formation from northwest to southeast at the B-Pond area. The 3A Pond borehole, drilled in the northwest, has the finer grain sizes and the lower measured hydraulic conductivity values, around 3 to 5 cm/sec. Hydraulic conductivity measurements on samples from the 3B Pond borehole to the southeast are higher, around 1E-4 to 1E-3 cm/sec. One measurement of 3E-8 was obtained on the clay silt sample taken at the water table from 3B Pond. No measurements were made on the single 3C Pond sample submitted for this determination because the sample was unsuitable.

Table 4-10. Physical Properties B-Pond Phase 3 Soil Samples.

Sample	Pond	Interval	Specific Gravity g/cm ³	Moisture (percent)	Hydraulic Conductivity cm/sec	Porosity (percent)
B00FL2	3A	20.4 - 23	NR	7.19	NR	NR
B00GS6	3A	51.13 - 54.10	2.81	17.13	4.3 E-5	36.14
B00GS7	3A	53.0 - 55.6	2.81	15.4	1.1 E-5	33.46
B00GT0	3A	67.5 - 69.65	2.81	NR	4.8 E-5	30.32
B00GT2	3A	75.7 - 77.90	2.72	18.01	NR	NR
B00GT9	3A	101.6 - 102.2	NR	4.44	NR	NR
B00GW2	3B	8.2 - 10.85	2.82	7.16	9.8 E-4	32.13
B00GW7	3B	14.4 - 17.1	2.81	3.9	7.6 E-4	25.14
B00GX0	3B	25.9 - 29.6	2.82	2.99	2.36 E-4	23.56
B00GX1 ^a	3B	25.9 - 29.6	NR	NR	NR	NR
B00GX7	3B	60 - 62.6	No test-sample uncompactd	5.35	No test-sample uncompactd	No test-sample uncompactd
B00GX9	3B	72.25 - 74.15	2.75	4.02	NR	20.50
B00GZ0	3B	83.0 - 85.9	2.76	3.03	5.4 E-3	29.87
B00GZ1	3B	83.0 - 85.9	2.74	NR	NR	NR
B00GZ4	3B	103.9 - 106.35	2.76	2.44	NR	22.64
B00GZ5	3B	103.9 - 106.35	2.75	3.92	NR	NR
B00GZ7	3B	117.5 - 119.3	2.69	20.88	3.0 E-8	35.76
B00H08	3C	11.7 - 13.7	No test-sample uncompactd	9.6	No test-sample uncompactd	No test-sample uncompactd
B00H12	3C	25.6 - 27.8	2.81	1.07	NR	37.71
B00H13 ^b	3C	25.6 - 27.8	NR	NR	NR	NR
B00H22	3C	76.9 - 79.4	NR	5.24	NR	No test-sample uncompactd

^a Sample only submitted for moisture-retention analysis.^b Sample only submitted for grain-size analysis.

NR Not requested

Table 4-11. Grain Size Analysis^a.

Cumulative Percent Passed Sieve Size -- Opening in Inches or Number of Mesh per Inch															
Sample	Pond	Depth	2.5	2	1.5	1	3/4	1/2	3/8	#4	#10	#40	#60	#100	#200
BOOFL2	3A	21.5	100	92.6	82.9	64.4	58	48.7	44.2	37.1	29.5	10.9	7.3	5.5	4.1
BOOGS6	3A	52	100	100	100	100	100	100	100	100	99.1	62.7	23.5	11.6	7
BOOGS7	3A	54.5	100	100	100	100	100	100	100	100	100	80.7	60.3	43.7	29.7
BOOGT2	3A	77	100	100	100	100	100	100	100	100	99.8	91.9	79.3	59.4	31.4
BOOGW2	3B	9.5	100	100	100	100	97	94.9	92.1	86.3	81.5	60.8	34.1	15.7	7.8
BOOGW7	3B	16	100	100	100	100	100	100	93.1	83.1	68.1	31.1	16.1	9.9	6.6
BOOGX7	3B	61.5	100	100	100	100	100	97.7	96.8	93.3	87.3	24.4	12.7	8.4	5.2
BOOGX9	3B	73	100	100	100	92.1	85	76.4	70.4	60.9	51.7	28.4	22.3	18.3	14.3
BOOGZ0	3B	84.5	100	100	100	100	98	88.2	81.3	66.8	52.3	29.3	23.3	18.9	14.2
BOOGZ1	3B	84.5	100	100	96.3	89.6	85.7	80.9	77.9	71.5	61.5	29.4	21.4	16.4	11.7
BOOGZ4 ^b	3B	105	100	100	81.7	67.2	61.9	54.9	48.1	37.6	NR	NR	NR	NR	NR
BOOGZ5	3B	105	100	97.6	94.1	83.7	77.5	69.8	65.5	56.8	46.9	28.4	23.1	19	14.5
BOOGZ7	3B	118.5	100	100	100	100	100	100	100	100	100	98.9	98.1	93.3	74.9
BOOH08	3C	12.5	100	100	92.8	86.6	81.5	76.4	73.5	68.8	63.1	13.9	8	5.8	4.2
BOOH12	3C	26.5	100	57.1	52.3	39	29.3	19.5	15.2	9.8	6.6	2.7	1.9	1.4	1.1
BOOH13	3C	26.5	100	88.5	83.6	---	62	---	43	32.2	22.8	12.3	9.7	7.9	5.8
BOOH22	3C	78	100	100	92.9	75.4	67.3	57.2	49.2	38.2	28	12.8	9.8	7.6	5.7

^aWashed fine grading also performed for most samples on material finer than No. 200 sieve.

^bSieve analysis not requested but performed to no. 4 for specific gravity determination.

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5.0 DISCUSSION AND COMPARISON TO DANGEROUS WASTE CRITERIA

The demonstration of clean closure requires that no 40 CFR Part 261 Appendix VIII constituents remain in the soils, vadose zone, or groundwater above regulatory agency recommended limits (EPA 1989). These limits include consideration of water quality standards and criteria, health-based limits based on published reference doses or carcinogenic potency factors, or site-specific agency-approved health advisories (52 FR 8706). The scope of analytical requirements may be reduced from all Appendix VIII constituents when it is reasonable to exclude some based on knowledge of past activities at the unit. In consideration of the potential effect of a waste on human health or the environment, EPA's proposed corrective action rules (55 FR 30798) expand the meaning of the term hazardous constituents to include those identified in 40 CFR Part 264 Appendix IX, commonly known as the Groundwater Monitoring List. Washington State's "Dangerous Waste Constituents List" (WAC 173-303-9905) includes additional constituents not found on the 40 CFR Part 261 Appendix VIII list. Clean closure will require that concentrations of such constituents pose no substantial threat to human health or the environment when left unmanaged.

For several years, two published statements have provided the fullest interpretation of EPA policy currently available concerning requirements applicable to units undergoing clean closure. Those two accounts are in the Federal Register (FR) starting at 52 FR 8704 and again starting at 53 FR 9944. The EPA has been working on issuance of a clean closure guidance document, however it is not known to be available at this time. It is anticipated that many aspects will reflect policy expressed in the proposed RCRA Corrective Action Rule issued July 27, 1990, (55 FR 30798). Recent legal rulings regarding the "mixture" and "derived-from" rule have led EPA to propose a concentration-based exemption criteria (CBEC) that would fundamentally change the application of RCRA Subtitle C (see 57 FR 21450). The proposal will also affect soil contaminated with listed waste, which is currently considered hazardous by the "contained-in" policy.

Surface impoundments containing unremoved regulated hazardous waste cannot remain open to receive nonhazardous waste (54 FR 33388). The 3A Pond, 3B Pond, and 3C Pond have been classified part of a RCRA TSD unit; however, no waters, sediments, or soils have demonstrated characteristics or criteria of a dangerous waste. A dangerous waste must meet one or more of the characteristics or criteria described in WAC 173-303.

Compounds listed on the Part A permit as being occasionally discharged into the B-Pond system include common acids and bases. Such chemicals are no longer hazardous when they lose the characteristic that caused them to be a hazard. In the case of corrosivity, a waste is regulated when the pH is less than or equal to 2 or greater than or equal to 12.5. In the case of solids, regulated status is determined on the solution derived by mixing with an equal weight of water. Both field pH data and pH reported in conjunction with BNA analyses at the split laboratory showed pH within criteria. Also, as evidenced by the aquatic life and vegetation at the unit, the soils would not be expected to exceed these criteria.

Cadmium nitrate was known to have been discharged at least twice since 1983 (during the operation of the B-Pond expansion ponds) to a TSD unit

feeding B-Pond (DOE 1990, Table 4-3). In sufficient concentration, this compound may cause a waste to be sufficiently toxic for regulation as a dangerous waste. Earlier Phase 1 studies did not indicate elevated total cadmium concentrations in surface sediments/soils of 3A, 3B, or 3C Ponds (WHC 1991). Phase 3 results found average concentrations at the 3A, 3B, and 3C Ponds boreholes to be <0.78 , <1.06 , and $1.72 \mu\text{g/g}$, respectively. These figures are well below those found at sagebrush sites and contingency-pond Phase 1 backgrounds. Phase 1 background tolerance limits were established at 8.23 and $9.58 \mu\text{g/g}$, respectively. No estimate of interlaboratory variability between the laboratories used for Phase 1 and Phase 3 analysis is available. A common cadmium range for soil is $0.1 - 7 \mu\text{g/g}$ (Shields 1988, p 101). Cadmium was undetected in all seven inorganic split samples. All values were reported $\leq 1.0 \mu\text{g/g}$.

Several compounds designated in the closure plan as having been disposed of at B-Pond include elements such as sodium and potassium, the compound ammonium, or the common anions nitrate, fluoride, and sulfate. These constituents are not listed hazardous waste constituents. They may cause a waste to be regulated as a dangerous waste only when present in extreme (i.e. toxic or deleterious) concentrations or as indicators of specific listed wastes. Phase 3 data demonstrates this is not the case for vadose zone soils in the 3A, 3B, and 3C Ponds.

Table 5-1 lists Phase 3 inorganic analytes that are listed in Washington State's "Dangerous Waste Constituents List" (WAC 173-303-9905). Concentrations are compared, where available, to two criteria: Phase 1 thresholds and concentrations meeting criteria for action levels under EPA's proposed RCRA Subpart S (Corrective Action for Solid Waste Management Units at Hazardous Waste Management Facilities--55 FR 30798). Each lobe is characterized by a mean concentration assumed to have a normal distribution of error. (Statistics are based on all regular samples; field and laboratory QC samples were not included in calculating averages or maximum values.) An upper 90 percent confidence limit is compared to Phase 1 threshold values. Thresholds were based on Phase 1 surface samples from areas of natural vegetation surrounding the TSD or an unused excavated dry contingency-pond area. For several constituents all Phase 1 samples for each background were undetected at concentrations greater than the contractual detection limit (CDL). In those cases the respective detection limits were given, as footnoted. Though the *representative* value is clearly defined by regulation and guidance as the *average* (40 CFR 260.10, or SW-846 Ch. 9, [EPA 1986]), a conservative comparison of the maximum reported regular sample value is also compared to EPA's example soil action levels.

Table 5-1. Evaluation of Inorganic Dangerous Waste Constituents in all Regular Samples.

WMC-SD-EN-AP-104 Rev. 0

Analyte	Pond	Frequency of Non-detects	Mean	Upper 90% Limit	Maximum Observation	Phase 1 Threshold Concentrations $\mu\text{g/g}$	Propose RCRA Corrective Action Level-Soil mg/Kg	Typical Soil Range ^a (ppm)	Mean Upper Limit Above Both Phase 1 Thresholds?	Maximum Above EPA Example Soil Action Level? ^d
Antimony	3A	16/20	<5.8	NC	14	<10.0 ^b	30	0.6 - 10	--	NO
	3B	20/20	<5.1	NC	5.8 U				--	NO
	3C	15/15	<5.2	NC	5.3 U				--	NO
Arsenic	3A	0/21	1.74	1.97	4.2	4.91 / 7.59	80	0.1 - 40	NO	NO
	3B	1/20	<2.25	2.90	7.2				NO	NO
	3C	0/11	1.46	1.76	2.5				NO	NO
Barium	3A	0/20	71.1	74.1	91	NC ^c	4000	100 - 3500	--	NO
	3B	0/20	77.6	80.7	96				--	NO
	3C	0/15	80.5	90.6	170				--	NO
Beryllium	3A	0/20	0.36	0.38	0.53	<0.5 ^b	0.2	0.1 - 40	--	YES
	3B	0/20	0.38	0.42	0.88				--	YES
	3C	0/15	0.31	0.33	0.41				--	YES
Cadmium	3A	1/20	<0.78	0.90	1.6	8.23 / 9.58	40	0.01 - 7	NO	NO
	3B	1/20	<1.06	1.19	1.8				NO	NO
	3C	0/15	1.72	1.89	2.5				NO	NO
Chromium	3A	0/20	8.17	9.35	16	12.86 / 8.78	400 (as Cr VI)	5 - 3000	NO	NO
	3B	0/20	12.0	13.6	25				YES	NO
	3C	0/15	9.23	11.2	27				NO	NO
Cyanide	3A	10/11	<0.9	NC	1 UJ	<0.5 ^b	2000	NA	--	NO
	3B	11/11	<0.7	NC	1 UJ				--	NO
	3C	8/9	<0.4	NC	1 UJ				--	NO
Lead	3A	0/21	4.89	5.97	18	15.16 / 7.13	NA	2 - 200	NO	--
	3B	0/20	5.24	6.58	20				NO	--
	3C	0/11	4.99	8.43	30				NO	--

Table 5-1. Evaluation of Inorganic Dangerous Waste Constituents in all Regular Samples.

Analyte	Pond	Frequency of Non-detects	Mean	Upper 90% Limit	Maximum Observation	Phase 1 Threshold Concentrations $\mu\text{g/g}$	Propose RCRA Corrective Action Level-Soil ^d mg/Kg	Typical Soil Range ^a (ppm)	Mean Upper Limit Above Both Phase 1 Thresholds?	Maximum Above EPA Example Soil Action Level? ^d
Mercury	3A	21/21	<1.0	NC	1.0 U	<0.2 ^b	20	0.01 - 0.8	--	NO
	3B	20/20	<1.0	NC	1.0 U				--	NO
	3C	7/7	<1.0	NC	1.0 U				--	NO
Nickel	3A	0/20	10.9	12.2	24	12.3 / 22.0	2000	5 - 1000	NO	NO
	3B	0/20	11.3	12.2	21				NO	NO
	3C	0/15	10.6	11.6	18				NO	NO
Selenium	3A	12/12	<0.70	NC	1.1 UD	<1.0 ^b	NA	0.1 - 2	--	--
	3B	11/11	<0.53	NC	0.61 U				--	--
	3C	6/6	<0.52	NC	0.52 U				--	--
Silver	3A	12/20	<0.75	NC	1.5	<1.0 ^b	200	0.01 - 5	--	NO
	3B	20/20	<0.62	NC	0.70 U				--	NO
	3C	15/15	<0.62	NC	0.64 U				--	NO
Thallium	3A	12/12	<1.04	NC	1.1 U	<1.0 ^b	NA	0.1 - 0.8	--	--
	3B	11/11	<1.04	NC	1.2 U				--	--
	3C	6/6	<1.00	NC	1.0 U				--	--

^a Source: Shields 1988 except for thallium from WMC 1991.^b All Phase 1 samples less than the stated contract detection limit--no threshold calculated.^c Threshold not calculated for total barium. All Phase 1 background values <105 $\mu\text{g/g}$.^d 55 FR 30798

NA Not applicable.

NC Not calculated.

Action levels are established for hazardous constituents for which data are sufficient to establish protective health- or environmental-based limits. "The Agency believes that it will very rarely be necessary to set action levels at background," (55 FR 30820). Action levels for soil generally assume exposure through consumption of soil contaminated with the hazardous constituent. Exposure assumptions are given in the proposed rule, and are based on a residential use pattern, including long-term direct contact and soil ingestion by children.

Action levels serve as rebuttable conservative presumptions that further study is necessary. Concentrations would "typically be measured on the surface (generally the upper two feet of earth)," (55 FR 30819). The EPA intends to use these levels as a presumption that a corrective measures study (CMS) may be necessary for contaminated deep soils, too. The permittee may attempt to rebut this presumption by demonstrating that there is no threat to human health and the environment from such deep soil contamination, either through direct contact or migration to aquifers or surface water.

Concentrations below capabilities of approved measurement methods designed to determine whether or not a sample contains a given dangerous waste constituent are presumed to be adequately protective of human health and the environment, i.e. satisfy the intent of regulation. Mercury, selenium, thallium, and cyanide were below contractual quantitation limits for all Phase 3 samples. Antimony and silver concentrations in all regular samples from the boreholes of 3B and 3C Ponds were also undetected at the stated limits. Likewise, all Phase 1 background measurements for all these analytes were below their respective reporting limits.

Antimony was detected in 4 of the 20 regular Phase 3 samples. The median sample value was undetectable (typically < 6 ppm). For comparison, the March 1990 EPA CLP Statement of Work CRDL for antimony in soil and sediment is 12 ppm. The maximum antimony concentration found in any single Phase 3 sample (14 $\mu\text{g/g}$), an extreme of the data set, was only slightly above a referenced typical natural range (0.6 - 10 ppm) and less than half the level EPA has proposed as protective of human health and the environment (30 mg/Kg). (No Phase 1 TSD or background soil sample was found at or above the CDL of 10.0 $\mu\text{g/g}$.) All Phase 3 split and field duplicate samples were consistent with the associated regular samples; each reported antimony as undetected.

Several other elements of Table 5-1 deserve mention. Beryllium was not found in any Phase 1 site or background samples at or above 0.5 $\mu\text{g/g}$, the CDL. This Phase 3 sampling had lower reporting limits. All regular Phase 3 samples were reported as detects, but values were similar. The vast majority were less than 0.5 $\mu\text{g/g}$. Split sample results suggested no significant primary laboratory bias. The EPA example action level of 0.2 mg/Kg (55 FR 30798) is frequently exceeded. Concentrations found in the vadose zone samples are entirely within the range of natural concentrations expected in the area based upon ranges found in the *Characterization and Use of Soil and Groundwater Background for the Hanford Site* (WHC-MR-0246, Rev 1).

Chromium Phase 1 threshold concentrations were frequently exceeded in the vadose zone. The highest average was found beneath the least used pond, the 3B Pond. The pond area used longer, the 3C Pond, had an intermediate concentration, and the oldest and most used of the expansion ponds, the 3A Pond, had the lowest average chromium concentration. This casts doubt on the premise

that wastewater disposal deposited hazardous concentrations of chromium to the land. The highest reported concentration ($27 \mu\text{g/g}$) was in the lowest 3C Pond sample (~80 ft); the associated split ($8.5 \mu\text{g/g}$) was also the highest of seven splits. The Phase 3 data imply a slight natural increase in concentration with depth at B-Pond, contrary to the pond and near-surface sediments being a hazardous waste. Naturally occurring typical soil ranges have been referenced at 5-3000 ppm (Shields 1988).

High chromium concentrations in a waste may cause it to be regulated because of toxicity. Chromium is considered more toxic when present as Cr(VI). This is why the action level of Table 5-1 is based on Cr(VI). Chromium is most stable as Cr(III). It is most commonly found in oxidation states 0, III, and VI.

Chromium was analyzed simultaneously with numerous other elements that showed a positive bias against the split laboratory results. A possible interelement correlation may exist because of common measurement system factors, (for example: digestion conditions). Comparisons between laboratories are confounded by left-censored data at the reporting limit. Using only samples that each laboratory found above their respective reporting limits (as if a random sample), insufficient information is available to contradict a null hypothesis of no significant bias; however, most samples at the split laboratory are undetected while corresponding primary laboratory samples are reported much higher. Under the assumption that the true nondetect split sample concentrations equal the reporting limit, the primary positive bias estimate would be minimized. The average bias in this case would be about $11 \mu\text{g/g}$, which is substantial when compared to the average reported concentrations.

Although validation did not detect accuracy problems via review of laboratory blanks or matrix spike recoveries, the validation did not consider field silica sand samples. A review of the seven silica sand blanks shows two of the seven were reported positive for Cr; one at 1.3, the other at $7.2 \mu\text{g/g}$. The remainder were $<1 \mu\text{g/g}$. Silica sand was not submitted to the split laboratory. However, all 11 Phase 1 values of similar silica sand were $<1 \mu\text{g/g}$.

The data suggest a potential positive bias in the concentrations reported by the primary laboratory. These factors should be considered in comparing Phase 1 to Phase 3 chromium concentrations. Nevertheless, the important point is not to promote more study but identify if there is a potential threat to human health or the environment. Acceptance of an inflated characteristic concentration will not change the conclusion of "no threat." The reported concentrations are more than an order of magnitude below limits the EPA has quoted as protective trigger levels for further investigation (upper 90 percent limit = $13.6 \mu\text{g/g}$ total Cr vs. $400 \mu\text{g/g}$ all Cr[VI]). Washington State has determined similar levels to be protective of human health and the environment. The state has promulgated environmental regulations setting "Method A" chromium cleanup levels for industrial soil at $500 \mu\text{g/Kg}$ (WAC 173-340-745). The most critical path is considered to be via inhalation. The level is based on exposure assumptions of breathing contaminated dust at the sites where hazardous chromium compounds were formerly released to the environment.

No designated, listed wastes are known to have been directly discharged to the B-Pond system while the expansion lobes were in service. Hydrazine is the sole designated, listed waste known to have been potentially discharged indirectly to the B-Pond system during operation of any of the B-Pond expansion ponds (DOE 1990). Five releases of this compound were documented to a TSD unit supplying B-Pond, the 216-A-29 Ditch--the latest in 1986 (DOE 1990). Hydrazine is a strong oxygen scavenger and will react with oxygen in water to form NH_4OH and nitrogen gas. It was not specifically addressed in Phase 3 because it was not expected to be present at the expansion ponds because of the extreme dilution and relatively age of the releases. Furthermore, no SW-846 (EPA 1986) method is specified to measure this constituent in soil. Air is the typical medium of concern for this compound. Several studies were found addressing the fate of hydrazine in aquatic environments. In one study, river and pond water were adjusted to the same dissolved oxygen level and temperature, and 5 mg/L of hydrazine was added. Hydrazine residues in river water containing substantial amounts of organic matter were 22.6 percent, 96 percent, and 100 percent degraded after approximately one hour, one day, and two days, respectively. In the pond water, residues were 20 percent, 74 percent, 80 percent, and 81.6 percent degraded after approximately one hr, one day, two days, and three days, respectively (Slonim and Gisclard 1976). Hydrazine has been used experimentally in vitro as medication for sickle cell disease (HSDB 1992¹). It has been found to be a natural product of nitrogen fixation by azotobacter algae (HSDB 1992¹). It has also been measured in cigarette smoke (HSDB 1992¹).

Most Appendix VIII (40 CFR 261) and Dangerous Waste (WAC 173-303) constituents are organic compounds. All investigated organic analytes were undetectable at representative site soil concentrations.

There is no indication that any investigated pesticide, PCB, herbicide, organophosphorous pesticide, dioxin, or furan is present in the vadose zone soil at the borehole sites. Several volatile and semivolatile target compounds were occasionally reported at concentrations less than PQL and/or contract required detection limit (CRDL). Tentatively identified volatile and semivolatile compounds were also noted in site samples, but performance on field duplicates, split, and silica sand samples suggests such occurrences are not representative of site soils.

¹ SilverPlatter Software Copyright (C), SilverPlatter International N. V. 1992

6.0 CONCLUSION

The B-Pond Phase 3 vadose zone investigation does not indicate hazardous levels of waste constituents exist in the vadose zone of the 216-B-3A, 216-B-3B, or 216-B-3C Ponds. Furthermore, results do not suggest dangerous, listed wastes exist in detectable, but dilute concentrations in the vadose zone. Nondangerous waste by definition, does not meet the statutory criteria of a "dangerous" or "hazardous" waste. Based on characteristics (ignitability, corrosivity, reactivity, toxicity) or criteria (carcinogenic, persistent, toxic), no compounds, organic or inorganic, were found in sufficient representative concentrations to cause the investigated vadose soils to be reasonably regulated as a dangerous waste.

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APPENDIX A

B-POND PHASE 3 SOIL DATA

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CONTENTS

Introduction	A-1
Reasons for Westinghouse Hanford Qualification-- Pesticides/Polychlorinated Biphenyls	A-11
Reasons for Westinghouse Hanford Company Qualification--Herbicides . . .	A-13
Reasons for Westinghouse Hanford Company Qualification--Organophosphorous Pesticides	A-22
Reasons for Westinghouse Hanford Company Qualification--Dioxins and Furans	A-26
Reasons for Westinghouse Hanford Company Qualification--Volatile Organics	A-35
Reasons for Westinghouse Hanford Company Qualification--Semivolatile Organic (Base/Neutral/Acid) Compounds	A-52
Reasons for Westinghouse Hanford Company Qualification--Analytes by Inductively Coupled Plasma (Aluminum-Zinc)	A-72
Reasons for Westinghouse Hanford Company Qualification--Analytes by Atomic Absorption Spectroscopy	A-77
Reasons for Westinghouse Hanford Company Qualification--Miscellaneous Analytes	A-82
References	A-88

93127610616

LIST OF TABLES

A-1.	B-Pond Phase 3 Pesticide/PCBs	A-3
A-2.	B-Pond Phase 3 Herbicide Data	A-12
A-3.	B-Pond Phase 3 Organophosphorous Pesticides	A-14
A-4.	B-Pond Phase 3 Dioxins & Furans	A-23
A-5.	Volatile Organic Compounds	A-27
A-6.	B-Pond Phase 3 Semivolatiles	A-36
A-7.	B-Pond Phase 3 Semivolatile Tentatively Identified Compounds . . .	A-54
A-8a.	Analytes by Inductively Coupled Plasma, Aluminum-Calcium	A-60
A-8b.	Analytes by Inductively Coupled Plasma, Chromium-Molybdenum . . .	A-64
A-8c.	Analytes by Inductively Coupled Plasma, Nickel-Zinc	A-68
A-9.	Analytes by Atomic Absorption Spectroscopy	A-73
A-10.	Miscellaneous Analytes	A-78
A-11.	List of Radioactivity Data (pCi/g)--Unvalidated.	A-83
A-12.	Gamma Energy Analysis Unvalidated, Raw Data.	A-86

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LIST OF TERMS

AAS	atomic absorbtion spectroscopy
CLP	contract laboratory program
CRQL	contract-required detection limit
ICP	inductively coupled plasma
MS	matrix spike
MSD	matrix spike duplicate
PCB	polychlorinated biphenyl
TIC	tentatively identified compound
Westinghouse Hanford-OSM	Westinghouse Hanford Company-Office of Sample Management

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Introduction

Each table in Appendix A typically is several pages long. Samples will be listed along one axis and analytes along the other. Where analytes are listed along the left-hand margin, results from a single group of samples will be visible for several pages before the end of the analyte list is reached. An analyte list appears in the same order for another set of samples until all results are reported and the table ends. In other tables, each analyte is listed along the top of a table and all samples are listed along the left-hand margin for several pages until all are reported and the table ends.

Data appearing in this appendix have been validated by the Westinghouse Hanford Company Office of Sample Management (Westinghouse Hanford-OSM). The primary exceptions are radiological characterization data, which are presented as is for information only. Validation is a systematic review of laboratory performance and execution of protocol that may qualify data based on holding time, matrix spike (MS), matrix spike duplicate (MSD) analysis, surrogate recovery, analytical blank performance, calibration, or any other method-specific requirements. As a result of data validation, qualification flags placed by the reporting laboratory may be replaced, supplemented or deleted. Westinghouse Hanford validation procedures can be found in WHC-CM-5-3 (WHC 1990). Many sample results were qualified according to holding time criteria established for water samples. This represents a conservative approach to validation. It is questionable if these time periods, especially in the case of extraction for organics, for soil matrices affect quality.

Several common concentration flags appear in the following tables. These include:

- "U" The analyte was undetected. (The associated number represents an upper bound estimate of an undetected analyte, usually a concentration corresponding to an established sample quantitation limit.)
- "J" The associated value is an estimated quantity. (This may be caused by any of a wide number of factors. It should alert the user that the associated value may have a slightly wider than usual *potential* for error.)

The above two flags may be combined and/or appear in conjunction with other qualifiers. The meaning of other flags will be listed at the end of each multipage table, as necessary. Results of inorganic constituents from the primary laboratory were reported to Westinghouse Hanford as "< x $\mu\text{g/g}$ " when undetected. For consistency in this report, these inorganic constituents reported by the primary laboratory are presented as the equivalent "x U $\mu\text{g/g}$ ". The CLP "Q" (quality) flags and "M" (method) flags reported on contract laboratory program (CLP) Form 1 are not shown for split samples because this information was not reported in the same format for those samples analyzed by SW-846 (EPA 1986) methods at the primary laboratory. Concentration or "C" flags are shown. One laboratory-reported concentration flag appearing ONLY with CLP inorganic split sample results is a "B" flag. This indicates when

the corresponding inorganic sample result is above an instrument detection limit but below the CLP contract-required detection limit (CRQL).

After each table, a brief summary of the reasons for Westinghouse Hanford data qualification will appear. Only concentration qualifiers added or altered by Westinghouse Hanford-OSM as a result of data validation will be addressed--not explanations for displayed standard laboratory-reported qualifiers. The explanation will first address samples analyzed at the primary laboratory--regular, field duplicate, and silica sand samples--then, if applicable, the split samples analyzed at an independent laboratory. Split samples were validated to criteria consistent with employed CLP procedure, except for radiological analyses, as already mentioned.

Most tables list some additional information about each reported field sample. Terms used to describe sample type include Regular (Reg), Field Duplicate (FDup), Field Split (Split), and clean Silica Sand (Blank) as described in the attached report. The terms 3A, 3B, and 3C Pond refer to the 216-B-3A Pond, 216-B-3B Pond, and 216-B-3C Pond, respectively. Sample depths are given as depth from the surface at the borehole to a midpoint of the sampled interval. ALL DEPTHS ARE LISTED IN FEET UNLESS SPECIFIED OTHERWISE.

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Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
alpha BHC	319-84-6	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
beta BHC	319-85-7	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
delta BHC	319-86-8	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
gamma BHC (Lindane)	58-89-9	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Heptachlor	76-44-8	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Aldrin	309-00-2	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Heptachlor Epoxide	1024-57-3	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Endosulfan I	959-98-8	14 UJ	13 UJ	13 UJ	13 UJ	13 UJ	14 UJ	12 UJ	13 UJ	13 UJ	16 UJ
Dieldrin	60-57-1	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
4,4'-DDE	72-55-9	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Endrin	72-20-8	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Endosulfan II	33213-65-9	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
4,4'-DDD	72-54-8	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Endosulfan Sulfate	1031-07-8	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
4,4'-DDT	50-29-3	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
Methoxychlor	72-43-5	140 UJ	130 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Endrin Ketone	53494-70-5	27 UJ	27 UJ	25 UJ	26 UJ	26 UJ	27 UJ	24 UJ	25 UJ	25 UJ	31 UJ
alpha-Chlorodane	5103-71-9	140 UJ	130 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
gamma-Chlorodane	5103-74-2	140 UJ	130 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ

A-3

WMC-SD-EN-AP-104 Rev. 0

Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
Toxaphene	8001-35-2	270 UJ	270 UJ	250 UJ	260 UJ	260 UJ	270 UJ	240 UJ	250 UJ	250 UJ	310 UJ
Arochlor 1016	12674-11-2	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1221	11104-28-2	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1232	11141-16-5	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1242	53469-21-9	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1248	12672-29-6	140 UJ	140 UJ	130 UJ	130 UJ	130 UJ	140 UJ	120 UJ	130 UJ	130 UJ	160 UJ
Arochlor 1254	11097-69-1	280 UJ	280 UJ	260 UJ	260 UJ	260 UJ	280 UJ	240 UJ	260 UJ	260 UJ	320 UJ
Arochlor 1260	11096-82-5	280 UJ	280 UJ	260 UJ	260 UJ	260 UJ	280 UJ	240 UJ	260 UJ	260 UJ	320 UJ

A-4

WMC-SD-EN-AP-104 Rev. 0

Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		53	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
alpha BHC	319-84-6	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
beta BHC	319-85-7	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
delta BHC	319-86-8	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
gamma BHC (Lindane)	58-89-9	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Heptachlor	76-44-8	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Aldrin	309-00-2	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Heptachlor Epoxide	1024-57-3	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Endosulfan I	959-98-8	9.7 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	13 UJ	60 UJ	60 UJ	62 UJ
Dieldrin	60-57-1	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
4,4'-DDE	72-55-9	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Endrin	72-20-8	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Endosulfan II	33213-65-9	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
4,4'-DDD	72-54-8	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Endosulfan Sulfate	1031-07-8	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
4,4'-DDT	50-29-3	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
Methoxychlor	72-43-5	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	600 UJ	600 UJ	620 UJ
Endrin Ketone	53494-70-5	19 UJ	26 UJ	25 UJ	26 UJ	25 UJ	25 UJ	25 UJ	120 UJ	120 UJ	120 UJ
alpha-Chlorodane	5103-71-9	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	600 UJ	600 UJ	620 UJ
gamma-Chlorodane	5103-74-2	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	600 UJ	600 UJ	620 UJ

A-5

WHC-SD-EN-AP-104 Rev. 0

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Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		53	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
Toxaphene	8001-35-2	190 UJ	260 UJ	250 UJ	260 UJ	250 UJ	250 UJ	250 UJ	1200 UJ	1200 UJ	1200 UJ
Arochlor 1016	12674-11-2	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1221	11104-28-2	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1232	11141-16-5	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1242	53469-21-9	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1248	12672-29-6	97 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	130 UJ	120 UJ	120 UJ	120 UJ
Arochlor 1254	11097-69-1	190 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	240 UJ	260 UJ	240 UJ
Arochlor 1260	11096-82-5	190 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	260 UJ	240 UJ	260 UJ	240 UJ

A-6

WMC-SD-EN-AP-104 Rev. 0

Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
alpha BHC	319-84-6	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
beta BHC	319-85-7	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
delta BHC	319-86-8	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
gamma BHC (Lindane)	58-89-9	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Heptachlor	76-44-8	62 UJ	62 UJ	8.0 U	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Aldrin	309-00-2	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Heptachlor Epoxide	1024-57-3	62 UJ	62 UJ	8.0 U	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Endosulfan I	959-98-8	62 UJ	62 UJ	8.0 UJ	62 UJ	63 UJ	63 UJ	140 UJ	92 UJ	120 UJ	130 UJ
Dieldrin	60-57-1	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
4,4'-DDE	72-55-9	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Endrin	72-20-8	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Endosulfan II	33213-65-9	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
4,4'-DDD	72-54-8	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Endosulfan Sulfate	1031-07-8	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
4,4'-DDT	50-29-3	120 UJ	120 UJ	16 UJ	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
Methoxychlor	72-43-5	620 UJ	620 UJ	80 U	620 UJ	630 UJ	630 UJ	1400 UJ	920 UJ	1200 UJ	1300 UJ
Endrin Ketone	53494-70-5	120 UJ	120 UJ	16 U	120 UJ	130 UJ	130 UJ	290 UJ	180 UJ	250 UJ	250 UJ
alpha-Chlorodane	5103-71-9	620 UJ	620 UJ	80 UJ	620 UJ	630 UJ	630 UJ	1400 UJ	920 UJ	1200 UJ	1300 UJ
gamma-Chlorodane	5103-74-2	620 UJ	620 UJ	80 UJ	620 UJ	630 UJ	630 UJ	1400 UJ	920 UJ	1200 UJ	1300 UJ

Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
Toxaphene	8001-35-2	1200 UJ	1200 UJ	160 U	1200 UJ	1300 UJ	1300 UJ	2900 UJ	1800 UJ	2500 UJ	2500 UJ
Arochlor 1016	12674-11-2	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1221	11104-28-2	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1232	11141-16-5	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1242	53469-21-9	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1248	12672-29-6	120 UJ	120 UJ	80 U	120 UJ	130 UJ	130 UJ	140 UJ	180 UJ	130 UJ	130 UJ
Arochlor 1254	11097-69-1	240 UJ	240 UJ	160 U	240 UJ	260 UJ	260 UJ	280 UJ	360 UJ	260 UJ	260 UJ
Arochlor 1260	11096-82-5	240 UJ	240 UJ	160 U	240 UJ	260 UJ	260 UJ	280 UJ	360 UJ	260 UJ	260 UJ

A-8

WHC-SD-EN-AP-104 Rev. 0

Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
alpha BHC	319-84-6	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
beta BHC	319-85-7	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
delta BHC	319-86-8	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
gamma BHC (Lindane)	58-89-9	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Heptachlor	76-44-8	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Aldrin	309-00-2	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 UJ	130 UJ	60 UJ	130 UJ	77 UJ
Heptachlor Epoxide	1024-57-3	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Endosulfan I	959-98-8	160 UJ	63 UJ	130 UJ	63 UJ	130 UJ	8.3 U	130 UJ	60 UJ	130 UJ	77 UJ
Dieldrin	60-57-1	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
4,4'-DDE	72-55-9	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
Endrin	72-20-8	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 UJ	260 UJ	120 UJ	260 UJ	150 UJ
Endosulfan II	33213-65-9	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
4,4'-DDD	72-54-8	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
Endosulfan Sulfate	1031-07-8	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
4,4'-DDT	50-29-3	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
Methoxychlor	72-43-5	1600 UJ	630 UJ	1300 UJ	630 UJ	1300 UJ	83 U	1300 UJ	600 UJ	1300 UJ	770 UJ
Endrin Ketone	53494-70-5	310 UJ	130 UJ	250 UJ	130 UJ	250 UJ	17 U	260 UJ	120 UJ	260 UJ	150 UJ
alpha-Chlorodane	5103-71-9	1600 UJ	630 UJ	1300 UJ	630 UJ	1300 UJ	83 UJ	1300 UJ	600 UJ	1300 UJ	770 UJ
gamma-Chlorodane	5103-74-2	1600 UJ	630 UJ	1300 UJ	630 UJ	1300 UJ	83 UJ	1300 UJ	600 UJ	1300 UJ	770 UJ

A-9

WMC-SD-EN-AP-104 Rev. 0

Table A-1. B-Pond Phase 3 Pesticide/PCBs. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
Toxaphene	8001-35-2	3100 UJ	1300 UJ	2500 UJ	1300 UJ	2500 UJ	170 U	2600 UJ	1200 UJ	2600 UJ	1500 UJ
Arochlor 1016	12674-11-2	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1221	11104-28-2	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1232	11141-16-5	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1242	53469-21-9	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1248	12672-29-6	160 UJ	130 UJ	130 UJ	130 UJ	130 UJ	83 U	130 UJ	120 UJ	130 UJ	150 UJ
Arochlor 1254	11097-69-1	320 UJ	260 UJ	260 UJ	260 UJ	260 UJ	170 U	260 UJ	240 UJ	260 UJ	300 UJ
Arochlor 1260	11096-82-5	320 UJ	260 UJ	260 UJ	260 UJ	260 UJ	170 U	260 UJ	240 UJ	260 UJ	300 UJ

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

A-10

WHC-SD-EN-AP-104 Rev. 0

Reasons for Westinghouse Hanford Qualification--
Pesticides/Polychlorinated Biphenyls

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

LABORATORY BLANK--Arochlor-1254, beta-BHC, and lindane were detected in laboratory blanks. This resulted in an undetected qualification, "U", of one or more of those analytes detected at similar concentrations in the following:

B00FK6	B00GS4	B00GW1	B00H02
B00FK7	B00GS9	B00GW3	B00H03
B00FK8	B00GT7	B00GW4	B00H04
B00FK9	B00GV5	B00GW8	B00H05
B00FL0	B00GV6	B00GX6	B00H06
B00FL1	B00GV7	B00GZ2	B00H10
B00FL3	B00GV8	B00GZ6	B00H14
B00FL4	B00GV9	B00GZ8	B00H19
B00GR9	B00GW0	B00H01	B00H23

SURROGATE RECOVERY--Recovery was high for sample B00H01. All pesticide/PCB constituents were undetected but qualified as "UJ" for B00H01.

Split Samples:

SURROGATE RECOVERY--Recovery was high for sample B00GS5. All pesticide/PCB constituents were undetected but qualified as "UJ" for B00GS5.

MS/MSD--Recovery was high for sample B00GS5. All pesticide/PCB constituents were undetected but qualified "UJ" per OSM guidelines.

Table A-2. B-Pond Phase 3 Herbicide Data. ($\mu\text{g/Kg}$)

SAMPLE	TYPE	POND	APPROXIMATE DEPTH (ft)	HERBICIDES	
				2,4-D	2,4,5-TP
B00FK6	Reg	3A	6.5	100 UJ	10 UJ
B00FK7	Reg	3A	8.5	100 UJ	10 UJ
B00FK8	Reg	3A	10.5	100 UJ	10 UJ
B00FK9	Reg	3A	13	100 UJ	10 UJ
B00FL0	Reg	3A	14.5	100 UJ	10 UJ
B00FL1	Reg	3A	16	100 UJ	10 UJ
B00FL3	Blank	3A	---	500 UJ	50 UJ
B00FL4	Reg	3A	28	500 UJ	50 UJ
B00GR9	Fdup	3A	28	500 UJ	50 UJ
B00GS4	Reg	3A	52.5	500 UJ	50 UJ
B00GS9	Reg	3A	66.5	500 UJ	50 UJ
B00GT7	Reg	3A	97	100 UJ	10 UJ
B00GV5	Reg	3A	143.5	150 UJ	15 UJ
B00GV6	Reg	3B	1	150 UJ	15 UJ
B00GV7	Reg	3B	3.5	150 UJ	15 UJ
B00GV8	Reg	3B	5.5	151 UJ	15.1 UJ
B00GV9	Blank	3B	---	150 UJ	15 UJ
B00GW0	Reg	3B	7.5	28 UJ	3 UJ
B00GW1	Reg	3B	9.5	29 UJ	3 UJ
B00GW3	Reg	3B	13	150 UJ	15 UJ
B00GW4	Fdup	3B	13	148 UJ	14.8 UJ
B00GW8	Reg	3B	21	30 UJ	3 UJ
B00GX6	Reg	3B	61.5	152 UJ	15.2 UJ
B00GZ2	Reg	3B	90.5	154 UJ	15.4 UJ
B00GZ6	Reg	3B	118.5	100 UJ	10 UJ
B00GZ8	Reg	3B	123.5	4900 UJ	490 UJ
B00H00	Reg	3C	1	100 UJ	10 UJ
B00H01	Reg	3C	3	100 UJ	10 UJ
B00H02	Reg	3C	5	98 UJ	10 UJ
B00H03	Reg	3C	7	960 UJ	96 UJ
B00H04	Reg	3C	9	990 UJ	99 UJ
B00H05	Fdup	3C	9	960 UJ	96 UJ
B00H06	Reg	3C	11.5	980 UJ	98 UJ
B00H14	Reg	3C	30	2400 UJ	240 UJ
B00H10	Blank	3C	---	990 UJ	99 UJ
B00H19	Reg	3C	60	990 UJ	99 UJ
B00H23	Reg	3C	80	100 UJ	10 UJ

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

Reasons for Westinghouse Hanford Company Qualification--Herbicides

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

Split Samples:

None.

9 3 1 2 7 6 1 0 6 6 2

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28
Azinphos-methyl	86-50-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos	2981-88-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos methyl	5598-13-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Coumaphos	56-72-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Demeton	8065-48-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Diazanone	333-41-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
DDVP (Dichlorvos)	62-73-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dimethoate	60-51-5	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Disulfoton	298-04-4	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
EPN	2104-64-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethion	563-12-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethoprop	13194-78-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Famphur	52-85-7	0.17 UJ	0.17 UJ	0.16 UJ	0.16 UJ	0.16 UJ	0.17 UJ	0.15 UJ	0.16 UJ	0.16 UJ
Fensulfothion	115-90-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fenthion	55-38-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Malathion	121-75-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Merphos	150-50-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Mevinphos	7786-34-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Monocrotophos	6923-22-4	NT	NT	NT	NT	NT	NT	NT	NT	NT

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28
Naled	300-76-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Parathion ethyl	156-38-2	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Parathion methyl	298-00-0	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ
Phorate	298-02-2	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ronnel	299-84-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sulfotepp	3689-24-5	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Sulprofos	35400-43-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
TEPP	21646-99-1	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachlorvinphos	22248-79-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Thionazin	297-97-2	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Trichloronate	327-98-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
o,o,o-Triethylphos phorothioate	126-68-1	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.025 UJ	0.03 UJ	0.03 UJ

A-15

WMC-SD-EN-AP-104 Rev. 0

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GS4	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B
DEPTH		53	66.5	97	143.5	1	3.5	5.5	---	7.5
Azinphos methly	86-50-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos	2981-88-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Chlorpyrifos methyl	5598-13-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
Coumaphos	56-72-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Demeton	8065-48-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Diazahon	333-41-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
DDVP (Dichlorvos)	62-73-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Dimethoate	60-51-5	0.13 UJ	0.11 UJ	0.10 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.11 UJ
Disulfoton	298-04-4	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
EPN	2104-64-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethion	563-12-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Ethoprop	13194-78-4	NT	NT	NT	NT	NT	NT	NT	NT	NT
Famphur	52-85-7	0.19 UJ	0.16 UJ	0.16 UJ	0.17 UJ	0.16 UJ	0.16 UJ	0.16 UJ	0.15 UJ	0.16 UJ
Fensulfothion	115-90-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fenthion	55-38-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Malathion	121-75-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Merphos	150-50-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Mevinphos	7786-34-7	NT	NT	NT	NT	NT	NT	NT	NT	NT
Monocrotophos	6923-22-4	NT	NT	NT	NT	NT	NT	NT	NT	NT

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GS4	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B
DEPTH		53	66.5	97	143.5	1	3.5	5.5	---	7.5
Naled	300-76-5	NT	NT	NT	NT	NT	NT	NT	NT	NT
Parathion ethyl	156-38-2	0.13 UJ	0.11 UJ	0.10 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.11 UJ
Parathion methyl	298-00-0	0.13 UJ	0.11 UJ	0.10 UJ	0.11 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.11 UJ
Phorate	298-02-2	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
Ronnel	299-84-3	NT	NT	NT	NT	NT	NT	NT	NT	NT
Sulfotepp	3689-24-5	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
Sulprofos	35400-43-2	NT	NT	NT	NT	NT	NT	NT	NT	NT
TEPP	21646-99-1	NT	NT	NT	NT	NT	NT	NT	NT	NT
Tetrachlorvinphos	22248-79-9	NT	NT	NT	NT	NT	NT	NT	NT	NT
Thionazin	297-97-2	0.06 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ
Trichloronate	327-98-0	NT	NT	NT	NT	NT	NT	NT	NT	NT
o,o,o-Triethylphos phorothioate	126-68-1	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	0.025 UJ	0.03 UJ

A-17

MHC-SD-EN-AP-104 Rev. 0

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GW1	B00GW3	B00GW4	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00
TYPE		Reg	Reg	Fdup	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C
DEPTH		9.5	13	13	21	61.5	90.5	118.5	123.5	1
Azinphos methly	86-50-0	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ
Chlorpyrifos	2981-88-2	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Chlorpyrifos methyl	5598-13-0	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Coumaphos	56-72-4	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.26 UJ	0.24 UJ	0.21 UJ
Demeton	8065-48-3	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Diazanone	333-41-5	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
DDVP (Dichlorvos)	62-73-7	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Dimethoate	60-51-5	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Disulfoton	298-04-4	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
EPN	2104-64-5	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Ethion	563-12-2	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Ethoprop	13194-78-4	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Famphur	52-85-7	0.16 UJ	0.16 UJ	0.16 UJ	0.16 UJ	NT	NT	NT	NT	NT
Fensulfothion	115-90-2	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Fenthion	55-38-9	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Malathion	121-75-5	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Merphos	150-50-5	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Mevinphos	7786-34-7	NT	NT	NT	NT	0.1 UJ	0.1 UJ	0.12 UJ	0.12 UJ	0.1 UJ
Monocrotophos	6923-22-4	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ

WMC-SD-EN-AP-104 Rev. 0

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00GW1	B00GW3	B00GW4	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00
TYPE		Reg	Reg	Fdup	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C
DEPTH		9.5	13	13	21	61.5	90.5	118.5	123.5	1
Naled	300-76-5	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ
Parathion ethyl	156-38-2	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Parathion methyl	298-00-0	0.10 UJ	0.10 UJ	0.10 UJ	0.10 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Phorate	298-02-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Ronnel	299-84-3	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Sulfotepp	3689-24-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
Sulprofos	35400-43-2	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
TEPP	21646-99-1	NT	NT	NT	NT	0.21 UJ	0.21 UJ	0.24 UJ	0.24 UJ	0.21 UJ
Tetrachlorvinphos	22248-79-9	NT	NT	NT	NT	0.26 UJ	0.26 UJ	0.30 UJ	0.31 UJ	0.26 UJ
Thionazin	297-97-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	NT	NT	NT	NT	NT
Trichloronate	327-98-0	NT	NT	NT	NT	0.05 UJ	0.05 UJ	0.06 UJ	0.06 UJ	0.05 UJ
o,o,o-Triethylphos phorothioate	126-68-1	0.03 UJ	0.03 UJ	0.03 UJ	0.03 UJ	NT	NT	NT	NT	NT

A-19

WHC-SD-EN-AP-104 Rev. 0.

9 3 1 2 7 5 1 0 6 6 9

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00H01	B00H02	B00H03	B00H04	B00H05	B00H06	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Reg	Fdup	Reg	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		3	5	7	9	9	11.5	30	---	60	80
Azinphos methly	86-50-0	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Chlorpyrifos	2981-88-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Chlorpyrifos methyl	5598-13-0	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Coumaphos	56-72-4	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Demeton	8065-48-3	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Diazanone	333-41-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DDVP (Dichlorvos)	62-73-7	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Dimethoate	60-51-5	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Disulfoton	298-04-4	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
EPN	2104-64-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ethion	563-12-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ethoprop	13194-78-4	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Famphur	52-85-7	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Fensulfothion	115-90-2	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Fenthion	55-38-9	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Malathion	121-75-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Merphos	150-50-5	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Mevinphos	7786-34-7	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 UJ	0.11 UJ	0.1 UJ	0.1 UJ	0.1 UJ
Monocrotophos	6923-22-4	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ

Table A-3. B-Pond Phase 3 Organophosphorous Pesticides. (mg/Kg)

ANALYTE	CAS#	B00H01	B00H02	B00H03	B00H04	B00H05	B00H06	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Reg	Fdup	Reg	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		3	5	7	9	9	11.5	30	---	60	80
Naled	300-76-5	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Parathion ethyl	156-38-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Parathion methyl	298-00-0	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Phorate	298-02-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Ronnel	299-84-3	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Sulfotepp	3689-24-5	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
Sulprofos	35400-43-2	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
TEPP	21646-99-1	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.21 UJ	0.22 UJ	0.21 UJ	0.20 UJ	0.21 UJ	0.21 UJ
Tetrachlorvinphos	22248-79-9	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	0.26 UJ	0.28 UJ	0.26 UJ	0.25 UJ	0.26 UJ	0.27 UJ
Thionazin	297-97-2	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Trichloronate	327-98-0	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
o,o,o-Triethylphos phorothioate	126-68-1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

NT Not a target analyte for this sample, see text.

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

WHC-SD-EN-AP-104 Rev. 0

Reasons for Westinghouse Hanford Company Qualification--Organophosphorous
Pesticides

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

Split Samples:

None.

9 3 1 2 7 5 1 0 6 7 1

Table A-4. B-Pond Phase 3 Dioxins & Furans. (ng/g)

ANALYTE	SAMPLE ID	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28
Total tetrachlorinated dibenzo-p-dioxins (TCDD)		0.062 UJ	0.060 UJ	0.056 UJ	0.11 UJ	0.071 UJ	0.068 UJ	0.042 UJ	0.056 UJ	0.051 UJ
Total pentachlorinated dibenzo-p-dioxins (PeCDD)		0.13 UJ	0.17 UJ	0.13 UJ	0.10 UJ	0.16 UJ	0.22 UJ	0.15 UJ	0.16 UJ	0.084 UJ
Total hexachlorinated dibenzo-p-dioxins (HxCDD)		0.12 UJ	0.18 UJ	0.13 UJ	0.40 UJ	0.17 UJ	0.15 UJ	0.11 UJ	0.15 UJ	0.18 UJ
Total heptachlorinated dibenzo-p-dioxins (HpCDD)		0.15 UJ	0.21 UJ	0.19 UJ	0.19 UJ	0.16 UJ	0.23 UJ	0.17 UJ	0.15 UJ	0.27 UJ
Total octachlorinated dibenzo-p-dioxins (OCDD)		0.13 UJ	0.21 UJ	0.13 UJ	0.11 UJ	0.16 UJ	0.17 UJ	0.15 UJ	0.15 UJ	0.21 UJ
Total tetrachlorinated dibenzo-furans (TCDF)		0.11 UJ	0.077 UJ	0.058 UJ	0.085 UJ	0.071 UJ	0.079 UJ	0.061 UJ	0.055 UJ	0.047 UJ
Total pentachlorinated dibenzo-furans (PeCDF)		0.039 UJ	0.053 UJ	0.046 UJ	0.058 UJ	0.047 UJ	0.050 UJ	0.036 UJ	0.049 UJ	0.058 UJ
Total hexachlorinated dibenzo-furans (HxCDF)		0.11 UJ	0.11 UJ	0.085 UJ	0.14 UJ	0.11 UJ	0.11 UJ	0.072 UJ	0.13 UJ	0.10 UJ
Total heptachlorinated dibenzo-furans (HpCDF)		0.13 UJ	0.17 UJ	0.11 UJ	0.13 UJ	0.13 UJ	0.19 UJ	0.13 UJ	0.23 UJ	0.14 UJ
Total octachlorinated dibenzo-furans (OCDF)		0.069 UJ	0.19 UJ	0.077 UJ	0.096 UJ	0.12 UJ	0.14 UJ	0.059 UJ	0.11 UJ	0.20 UJ

A-23

WMC-SD-EN-AP-104 Rev. 0

Table A-4. B-Pond Phase 3 Dioxins & Furans. (ng/g)

ANALYTE	SAMPLE ID	B00GS4	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0
	TYPE	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg
	POND	3A	3A	3A	3A	3B	3B	3B	3B	3B
	DEPTH	52.5	66.5	97	143.5	1	3.5	5.5	---	7.5
Total tetrachlorinated dibenzo-p-dioxins (TCDD)		0.17 UJ	0.12 UJ	0.063 UJ	0.086 UJ	0.070 UJ	0.044 UJ	0.036 UJ	0.048 UJ	0.032 UJ
Total pentachlorinated dibenzo-p-dioxins (PeCDD)		0.30 UJ	0.35 UJ	0.21 UJ	0.20 UJ	0.16 UJ	0.12 UJ	0.087 UJ	0.11 UJ	0.057 UJ
Total hexachlorinated dibenzo-p-dioxins (HxCDD)		0.29 UJ	0.25 UJ	0.14 UJ	0.28 UJ	0.19 UJ	0.15 UJ	0.15 UJ	0.14 UJ	0.098 UJ
Total heptachlorinated dibenzo-p-dioxins (HpCDD)		0.24 UJ	0.27 UJ	0.13 UJ	0.14 UJ	0.19 UJ	0.12 UJ	0.11 UJ	0.13 UJ	0.11 UJ
Total octachlorinated dibenzo-p-dioxins (OCDD)		0.23 UJ	0.27 UJ	0.12 UJ	0.090 UJ	0.25 UJ	0.15 UJ	0.12 UJ	0.067 UJ	0.13 UJ
Total tetrachlorinated dibenzo-furans (TCDF)		0.14 UJ	0.14 UJ	0.058 UJ	0.084 UJ	0.051 UJ	0.038 UJ	0.033 UJ	0.038 UJ	0.033 UJ
Total pentachlorinated dibenzo-furans (PeCDF)		0.069 UJ	0.067 UJ	0.057 UJ	0.052 UJ	0.082 UJ	0.035 UJ	0.036 UJ	0.051 UJ	0.046 UJ
Total hexachlorinated dibenzo-furans (HxCDF)		0.084 UJ	0.15 UJ	0.086 UJ	0.072 UJ	0.10 UJ	0.094 UJ	0.093 UJ	0.095 UJ	0.073 UJ
Total heptachlorinated dibenzo-furans (HpCDF)		0.15 UJ	0.14 UJ	0.23 UJ	0.12 UJ	0.14 UJ	0.097 UJ	0.093 UJ	0.14 UJ	0.084 UJ
Total octachlorinated dibenzo-furans (OCDF)		0.030 UJ	0.19 UJ	0.12 UJ	0.13 UJ	0.21 UJ	0.10 UJ	0.13 UJ	0.13 UJ	0.066 UJ

Table A-4. B-Pond Phase 3 Dioxins & Furans. (ng/g)

ANALYTE	SAMPLE ID	B00GW1	B00GW3	B00GW4	B00GW8	B00H00	B00H02	B00H03
TYPE		Reg	Reg	Fdup	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3C	3C	3C
DEPTH		9.5	13	13	21	1	5	7
Total tetrachlorinated dibenzo-p-dioxins (TCDD)		0.041 UJ	0.047 UJ	0.031 UJ	0.044 UJ	0.10 UJ	0.16 UJ	0.12 UJ
Total pentachlorinated dibenzo-p-dioxins (PeCDD)		0.080 UJ	0.12 UJ	0.090 UJ	0.13 UJ	0.15 UJ	0.12 UJ	0.38 UJ
Total hexachlorinated dibenzo-p-dioxins (HxCDD)		0.11 UJ	0.12 UJ	0.087 UJ	0.16 UJ	0.20 UJ	0.22 UJ	0.17 UJ
Total heptachlorinated dibenzo-p-dioxins (HpCDD)		0.15 UJ	0.14 UJ	0.11 UJ	0.13 UJ	0.24 UJ	0.27 UJ	0.17 UJ
Total octachlorinated dibenzo-p-dioxins (OCDD)		0.15 UJ	0.096 UJ	0.14 UJ	0.11 UJ	0.23 UJ	0.32 UJ	0.15 UJ
Total tetrachlorinated dibenzo-furans (TCDF)		0.035 UJ	0.039 UJ	0.050 UJ	0.052 UJ	0.062 UJ	0.077 UJ	0.067 UJ
Total pentachlorinated dibenzo-furans (PeCDF)		0.047 UJ	0.038 UJ	0.045 UJ	0.035 UJ	0.19 UJ	0.10 UJ	0.11 UJ
Total hexachlorinated dibenzo-furans (HxCDF)		0.11 UJ	0.088 UJ	0.066 UJ	0.11 UJ	0.23 UJ	0.15 UJ	0.18 UJ
Total heptachlorinated dibenzo-furans (HpCDF)		0.10 UJ	0.10 UJ	0.079 UJ	0.082 UJ	0.53 UJ	0.19 UJ	0.32 UJ
Total octachlorinated dibenzo-furans (OCDF)		0.094 UJ	0.16 UJ	0.11 UJ	0.13 UJ	0.14 UJ	0.23 UJ	0.12 UJ

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

Reasons for Westinghouse Hanford Company Qualification--Dioxins and Furans

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". All samples extracted outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

Split Samples:

None.

9 3 1 2 7 6 1 0 6 7 5

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
ANALYSIS DATE		2/20/91	2/20/91	2/20/91	2/22/91	2/22/91	2/20/91	2/22/91	2/28/91	2/22/91	2/20/91
MOISTURE (%)		12	10.9	5.3	6.7	6.8	11.2	0.0	4.9	5.3	23.2
Chloromethane	74-87-3	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Bromomethane	74-83-9	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Vinyl Chloride	75-01-4	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Chloroethane	75-00-3	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Methylene Chloride	75-09-2	6 U	4 J	3 J	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Acetone	67-64-1	11 U	64	55	11 U	13	11 U	17	11 UJ	27	13 U
Carbon Disulfide	75-15-0	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1-Dichloroethene	75-35-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1-Dichloroethane	75-34-3	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,2-Dichloroethene (total)	540-59-0	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Chloroform	67-66-3	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,2-Dichloroethane	107-06-2	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
2-Butanone	78-93-3	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
1,1,1-Trichloroethane	71-55-6	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Carbon Tetrachloride	56-23-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Vinyl Acetate	108-05-4	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Bromodichloromethane	75-27-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U

9 3 1 2 7 5 1 0 6 7 7

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
ANALYSIS DATE		2/20/91	2/20/91	2/20/91	2/22/91	2/22/91	2/20/91	2/22/91	2/28/91	2/22/91	2/20/91
MOISTURE (%)		12	10.9	5.3	6.7	6.8	11.2	0.0	4.9	5.3	23.2
1,2-Dichloropropane	78-87-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
cis-1,3-Dichloropropene	10061-01-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Trichloroethene	79-01-6	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Dibromochloromethane	124-48-1	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1,2-Trichloroethane	79-00-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Benzene	71-43-2	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
trans-1,3-Dichloropropene	10061-02-6	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Bromoform	75-25-2	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
4-Methyl-2-pentanone	108-10-1	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
2-Hexanone	591-78-6	11 U	11 U	11 U	11 U	11 U	11 U	10 U	11 UJ	11 U	13 U
Tetrachloroethene	127-18-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
1,1,2,2-Tetrachloroethane	79-34-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Toluene	108-88-3	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Chlorobenzene	108-90-7	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Ethylbenzene	100-41-4	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Styrene	100-42-5	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U
Xylene (total)	1330-20-7	6 U	6 U	5 U	5 U	5 U	6 U	5 U	5 UJ	5 U	7 U

A-28

WHC-SD-EN-AP-104 Rev. 0

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
ANALYSIS DATE		2/26/91	2/28/91	2/28/91	3/4/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91
MOISTURE (%)		19	7.3	4.0	NA	5.0	4.0	5.0	0.0	0.0	3.1
Chloromethane	74-87-3	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Bromomethane	74-83-9	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Vinyl Chloride	75-01-4	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Chloroethane	75-00-3	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Methylene Chloride	75-09-2	30 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	67-64-1	18 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Carbon Disulfide	75-15-0	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	75-35-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	75-34-3	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	540-59-0	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroform	67-66-3	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	107-06-2	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	78-93-3	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
1,1,1-Trichloroethane	71-55-6	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	56-23-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	108-05-4	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Bromodichloromethane	75-27-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
ANALYSIS DATE		2/26/91	2/28/91	2/28/91	3/4/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91	3/11/91
MOISTURE (%)		19	7.3	4.0	NA	5.0	4.0	5.0	0.0	0.0	3.1
1,2-Dichloropropane	78-87-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	10061-01-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	79-01-6	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	124-48-1	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	79-00-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	71-43-2	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	10061-02-6	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	75-25-2	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	108-10-1	12 U	11 U	10 U	3 J	11 U	10 U	11 U	10 U	10 U	10 U
2-Hexanone	591-78-6	12 U	11 U	10 U	10 U	11 U	10 U	11 U	10 U	10 U	10 U
Tetrachloroethene	127-18-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	79-34-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	108-88-3	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	108-90-7	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	100-41-4	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	100-42-5	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylene (total)	1330-20-7	6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U

A-30

MHC-SD-EN-AP-104 Rev. 0

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
ANALYSIS DATE		3/11/91	3/11/91	3/12/91	3/11/91	3/21/91	3/21/91	3/21/91	3/22/91	3/21/91	3/21/91
MOISTURE (%)		3.0	3.0	3	3.1	5.4	5.0	16.7	34.5	3.9	4.8
Chloromethane	74-87-3	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Bromomethane	74-83-9	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Vinyl Chloride	75-01-4	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Chloroethane	75-00-3	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Methylene Chloride	75-09-2	5 U	5 U	44 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Acetone	67-64-1	10 U	10 U	19 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Carbon Disulfide	75-15-0	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1-Dichloroethene	75-35-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1-Dichloroethane	75-34-3	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,2-Dichloroethene (total)	540-59-0	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Chloroform	67-66-3	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,2-Dichloroethane	107-06-2	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
2-Butanone	78-93-3	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
1,1,1-Trichloroethane	71-55-6	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Carbon Tetrachloride	56-23-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Vinyl Acetate	108-05-4	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Bromodichloromethane	75-27-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U

MHC-SD-EN-AP-104 Rev. 0

A-31

9 3 1 2 7 6 1 0 6 8 1

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
ANALYSIS DATE		3/11/91	3/11/91	3/12/91	3/11/91	3/21/91	3/21/91	3/21/91	3/22/91	3/21/91	3/21/91
MOISTURE (%)		3.0	3.0	3	3.1	5.4	5.0	16.7	34.5	3.9	4.8
cis-1,3-Dichloropropene	10061-01-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Trichloroethene	79-01-6	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Dibromochloromethane	124-48-1	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1,2-Trichloroethane	79-00-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Benzene	71-43-2	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
trans-1,3-Dichloropropene	10061-02-6	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Bromoform	75-25-2	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
4-Methyl-2-pentanone	108-10-1	10 U	10 U	10 U	10 U	3 J	3 J	13 U	15 U	10 U	11 U
2-Hexanone	591-78-6	10 U	10 U	10 U	10 U	11 U	11 U	13 U	15 U	10 U	11 U
Tetrachloroethene	127-18-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
1,1,2,2-Tetrachloroethane	79-34-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Toluene	108-88-3	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Chlorobenzene	108-90-7	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Ethylbenzene	100-41-4	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Styrene	100-42-5	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U
Xylene (total)	1330-20-7	5 U	5 U	5 U	5 U	5 U	5 U	6 U	8 U	5 U	5 U

A-32

MHC-SD-EN-AP-104 Rev. 0

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
ANALYSIS DATE		3/21/91	3/28/91	3/22/91	3/22/91	3/22/91	3/26/91	4/2/91	3/28/91	4/2/91	4/2/91
MOISTURE (%)		4.8	NA	5.0	4.3	5.6	6	8.7	NA	6.1	22.3
Chloromethane	74-87-3	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Bromomethane	74-83-9	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Vinyl Chloride	75-01-4	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Chloroethane	75-00-3	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Methylene Chloride	75-09-2	5 U	5 U	5 U	5 U	5 U	31 U	5 U	5 U	5 U	6 U
Acetone	67-64-1	15 U	10 U	11 U	10 U	11 U	20 U	11 U	10 U	49	13 U
Carbon Disulfide	75-15-0	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethene	75-35-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1-Dichloroethane	75-34-3	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloroethene (total)	540-59-0	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Chloroform	67-66-3	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloroethane	107-06-2	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
2-Butanone	78-93-3	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
1,1,1-Trichloroethane	71-55-6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Carbon Tetrachloride	56-23-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Vinyl Acetate	108-05-4	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Bromodichloromethane	75-27-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,2-Dichloropropane	78-87-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U

Table A-5. Volatile Organic Compounds. ($\mu\text{g/Kg}$)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
ANALYSIS DATE		3/21/91	3/28/91	3/22/91	3/22/91	3/22/91	3/26/91	4/2/91	3/28/91	4/2/91	4/2/91
MOISTURE (%)		4.8	NA	5.0	4.3	5.6	6	8.7	NA	6.1	22.3
cis-1,3-Dichloropropene	10061-01-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Trichloroethene	79-01-6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Dibromochloromethane	124-48-1	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1,2-Trichloroethane	79-00-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Benzene	71-43-2	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
trans-1,3-Dichloropropene	10061-02-6	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Bromoform	75-25-2	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
4-Methyl-2-pentanone	108-10-1	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
2-Hexanone	591-78-6	11 U	10 U	11 U	10 U	11 U	11 U	11 U	10 U	11 U	13 U
Tetrachloroethene	127-18-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
1,1,2,2-Tetrachloroethane	79-34-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Toluene	108-88-3	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Chlorobenzene	108-90-7	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Ethylbenzene	100-41-4	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Styrene	100-42-5	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U
Xylene (total)	1330-20-7	5 U	5 U	5 U	5 U	5 U	6 U	5 U	5 U	5 U	6 U

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

Reasons for Westinghouse Hanford Company Qualification--Volatile Organics

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--B00FL4 was qualified as estimated, "J". Fourteen day holding time criteria established for water missed on sample B00FL4 by 7 days.

LABORATORY BLANK--Acetone was qualified as undetected at 15 $\mu\text{g/Kg}$ in B00H02 because acetone was also reported in the associated laboratory blank (#910321-027). A summary of VOA Reagent Blanks at Primary Lab:

Nine laboratory blanks total:

6 with no reported contaminants

1 with Acetone at 26 $\mu\text{g/Kg}$ (3/21/91)

1 with 4-methyl-2-pentanone at 3 J $\mu\text{g/Kg}$ (2/28/91)

1 with an unknown tentatively identified compound (TIC) at 7 J $\mu\text{g/Kg}$ (3/22/91)

Split Samples:

LABORATORY BLANK--Methylene chloride and acetone were found in laboratory blanks, and were qualified as undetected, "U", in samples B00H07, B00GW5, and B00GS5.

CALIBRATION--Two samples had analytes qualified because of separate exceedances of Westinghouse Hanford-OSM's calibration criteria. All analytes were undetected. Sample B00H07 was qualified "UJ" for the following analytes:

alpha BHC	aldrin	chlordan
beta BHC	endrin	gamma chlordan
delta BHC	alpha	

Sample B00GW5 was qualified "UJ" for the following analytes:

alpha BHC	aldrin	endosulfan sulfate
beta BHC	endosulfan I	4,4'-DDT
delta BHC	4,4'-DDE	alpha chlordan
gamma BHC (lindane)	4,4'-DDD	gamma chlordan

Additional Note to Volatile Organic Compound Data, Table A-5.

Three "unknown" compounds were reported as VOA TICs: 19 J, 22 J, 11 J $\mu\text{g/Kg}$ in the regular sample B00GV5. No similar compounds were found in the associated laboratory blank.

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
EXTRACTION DATE		2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
ANALYSIS DATE		2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
Phenol	108-95-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
bis(2-chloroethyl)ether	111-44-4	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Chlorophenol	95-57-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,3-Dichlorobenzene	541-73-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,4-Dichlorobenzene	106-46-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzyl Alcohol	100-51-6	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,2-Dichlorobenzene	95-50-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Methylphenol	95-48-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
bis(2-Chloroisopropyl) ether	108-60-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Methylphenol	106-44-5	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
N-Nitrosodipropylamine	621-64-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachloroethane	67-72-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Nitrobenzene	98-95-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
isophorone	78-59-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Nitrophenol	88-75-5	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4-Dimethylphenol	105-67-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzoic acid	65-85-0	5400 UJ	590 J	520 J	5100 UJ	360 J	470 J	4800 UJ	370 J	390 J	6300 UJ
bis(2-chloroethoxy)methane	111-91-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
EXTRACTION DATE		2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
ANALYSIS DATE		2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
2,4-Dichlorophenol	120-83-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
1,2,4-Trichlorobenzene	120-82-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Naphthalene	91-20-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Chloroaniline	106-47-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachlorobutadiene	87-68-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Chloro-3-methylphenol	59-50-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Methylnaphthalene	91-57-6	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachlorocyclopentadiene	77-47-4	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4,6-Trichlorophenol	88-06-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4,5-Trichlorophenol	95-95-4	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
2-Chloronaphthalene	91-58-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2-Nitroaniline	88-74-4	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
Dimethylphthalate	131-11-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Acenaphthylene	208-96-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
3-Nitroaniline	99-09-2	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
Acenaphthene	83-32-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4-Dinitrophenol	51-28-5	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
4-Nitrophenol	100-02-7	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ

WMC-SD-EN-AP-104 Rev. 0

A-37

9 3 1 2 7 5 1 0 6 3 7

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
EXTRACTION DATE		2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
ANALYSIS DATE		2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
Dibenzofuran	132-64-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,4-Dinitrotoluene	121-14-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
2,6-Dinitrotoluene	606-20-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Diethylphthalate	84-66-2	1100 UJ	170 J	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	210 J
4-Chlorophenyl-phenylether	7005-72-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Fluorene	86-73-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Nitroaniline	100-01-6	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
4,6-Dinitro-2-methylphenol	534-52-1	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
N-Nitrosodiphenylamine	86-30-6	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
4-Bromophenyl-phenylether	101-55-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Hexachlorobenzene	118-74-1	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Pentachlorophenol	87-86-5	5400 UJ	5400 UJ	5100 UJ	5100 UJ	5200 UJ	5400 UJ	4800 UJ	5000 UJ	5100 UJ	6300 UJ
Phenanthrene	85-01-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Anthracene	120-12-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Di-n-Butylphthalate	84-74-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Fluoranthene	206-44-0	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Pyrene	129-00-0	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Butylbenzylphthalate	85-68-7	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00FK6	B00FK7	B00FK8	B00FK9	B00FL0	B00FL1	B00FL3	B00FL4	B00GR9	B00GS4
TYPE		Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Fdup	Reg
POND		3A	3A	3A	3A	3A	3A	3A	3A	3A	3A
DEPTH		6.5	8.5	10.5	13	14.5	16	---	28	28	52.5
EXTRACTION DATE		2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91	2/24/91
ANALYSIS DATE		2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	2/28/91	3/1/91
3,3'-Dichlorobenzidine	91-94-1	2200 UJ	2200 UJ	2100 UJ	2100 UJ	2100 UJ	2200 UJ	2000 UJ	2100 UJ	2100 UJ	1300 UJ
Benzo(a)anthracene	56-55-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
bis(2-ethylhexyl)phthalate	117-81-7	1100 UJ	1100 UJ	1100 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1400 UJ
Chrysene	218-01-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Di-n-octylphthalate	117-84-0	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(b)fluoranthene	205-99-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(k)fluoranthene	207-08-9	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(a)pyrene	50-32-8	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Dibenz(a,h)anthracene	53-70-3	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
Benzo(g,h,i)perylene	191-24-2	1100 UJ	1100 UJ	1000 UJ	1100 UJ	1100 UJ	1100 UJ	990 UJ	1000 UJ	1000 UJ	1300 UJ
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	?	No	No	?	No
Total TICs		7	7	8	6	8	8	2	7	9	8
TICs without laboratory "B" flags		3	3	4	2	5	5	0	4	6	4

WHC-SD-EN-AP-104 Rev. 0

A-39

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
EXTRACTION DATE		2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
ANALYSIS DATE		3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
Phenol	108-95-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
bis(2-chloroethyl)ether	111-44-4	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Chlorophenol	95-57-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,3-Dichlorobenzene	541-73-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,4-Dichlorobenzene	106-46-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzyl Alcohol	100-51-6	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,2-Dichlorobenzene	95-50-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Methylphenol	95-48-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
bis(2-Chloroisopropyl) ether	108-60-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Methylphenol	106-44-5	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
N-Nitrosodipropylamine	621-64-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachloroethane	67-72-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Nitrobenzene	98-95-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Isophorone	78-59-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Nitrophenol	88-75-5	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4-Dimethylphenol	105-67-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzoic acid	65-85-0	2200 U	830 J	5000 UJ	4800 UJ	290 J	240 J	5100 U	4800 U	4800 U	5000 UJ
bis(2-chloroethoxy)methane	111-91-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
EXTRACTION DATE		2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
ANALYSIS DATE		3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
2,4-Dichlorophenol	120-83-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
1,2,4-Trichlorobenzene	120-82-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Naphthalene	91-20-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Chloroaniline	106-47-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachlorobutadiene	87-68-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Chloro-3-methylphenol	59-50-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Methylnaphthalene	91-57-6	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachlorocyclopentadiene	77-47-4	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4,6-Trichlorophenol	88-06-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4,5-Trichlorophenol	95-95-4	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
2-Chloronaphthalene	91-58-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2-Nitroaniline	88-74-4	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
Dimethylphthalate	131-11-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Acenaphthylene	208-96-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
3-Nitroaniline	99-09-2	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
Acenaphthene	83-32-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4-Dinitrophenol	51-28-5	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
4-Nitrophenol	100-02-7	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ

A-41

WHC-SD-EN-AP-104 Rev. 0

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
EXTRACTION DATE		2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
ANALYSIS DATE		3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
Dibenzofuran	132-64-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,4-Dinitrotoluene	121-14-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
2,6-Dinitrotoluene	606-20-2	NA	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Diethylphthalate	84-66-2	95 J	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U*	1000UJ*
4-Chlorophenyl-phenylether	7005-72-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Fluorene	86-73-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Nitroaniline	100-01-6	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
4,6-Dinitro-2-methylphenol	534-52-1	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
N-Nitrosodiphenylamine	86-30-6	450 U ¹	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
4-Bromophenyl-phenylether	101-55-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Hexachlorobenzene	118-74-1	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Pentachlorophenol	87-86-5	2200 U	5200 UJ	5000 UJ	4800 UJ	4800 U	4800 U	5100 U	4800 U	4800 U	5000 UJ
Phenanthrene	85-01-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Anthracene	120-12-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Di-n-Butylphthalate	84-74-2	450 U*	1100 UJ	1000 UJ	990 UJ	2500 U	990 U	1000 U	1900 U	990 U	1800 UJ
Fluoranthene	206-44-0	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Pyrene	129-00-0	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Butylbenzylphthalate	85-68-7	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ

WHC-SD-EN-AP-104 Rev. 0

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GS5	B00GS9	B00GT7	B00GV5	B00GV6	B00GV7	B00GV8	B00GV9	B00GW0	B00GW1
TYPE		Split	Reg	Reg	Reg	Reg	Reg	Reg	Blank	Reg	Reg
POND		3A	3A	3A	3A	3B	3B	3B	3B	3B	3B
DEPTH		52.5	66.5	97	143.5	1	3.5	5.5	---	7.5	9.5
EXTRACTION DATE		2/24/91	2/24/91	2/27/91	3/7/91	3/7/91	3/7/91	3/7/91	3/12/91	3/12/91	3/12/91
ANALYSIS DATE		3/1/91	3/1/91	3/5/91	3/12/91	3/12/91	3/12/91	3/12/91	3/14/91	3/14/91	4/2/91
3,3'-Dichlorobenzidine	91-94-1	900 U	2200 UJ	2100 UJ	2000 UJ	2000 U	2000 U	2100 U	2000 U	2000 U	2000 UJ
Benzo(a)anthracene	56-55-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
bis(2-ethylhexyl)phthalate	117-81-7	450 U*	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Chrysene	218-01-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Di-n-octylphthalate	117-84-0	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(b)fluoranthene	205-99-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(k)fluoranthene	207-08-9	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(a)pyrene	50-32-8	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Dibenz(a,h)anthracene	53-70-3	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
Benzo(g,h,i)perylene	191-24-2	450 U	1100 UJ	1000 UJ	990 UJ	990 U	990 U	1000 U	990 U	990 U	1000 UJ
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	No	No	No	No	No
Total TICs		0	8	13	7	17	9	7	16	11	9
TICs without laboratory "B" flags		0	4	11	4	9	2	2	8	4	2

A-43

MHC-SD-EN-AP-104 Rev. 0

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
EXTRACTION DATE		3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
ANALYSIS DATE		4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
Phenol	108-95-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
bis(2-chloroethyl)ether	111-44-4	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Chlorophenol	95-57-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,3-Dichlorobenzene	541-73-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,4-Dichlorobenzene	106-46-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzyl Alcohol	100-51-6	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,2-Dichlorobenzene	95-50-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Methylphenol	95-48-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
bis(2-Chloroisopropyl) ether	108-60-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Methylphenol	106-44-5	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
N-Nitrosodipropylamine	621-64-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachloroethane	67-72-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Nitrobenzene	98-95-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Isophorone	78-59-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Nitrophenol	88-75-5	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4-Dimethylphenol	105-67-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzoic acid	65-85-0	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300UJ*	5000 UJ	5000 UJ
bis(2-chloroethoxy)methane	111-91-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg.	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
EXTRACTION DATE		3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
ANALYSIS DATE		4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
2,4-Dichlorophenol	120-83-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
1,2,4-Trichlorobenzene	120-82-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Naphthalene	91-20-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Chloroaniline	106-47-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachlorobutadiene	87-68-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Chloro-3-methylphenol	59-50-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Methylnaphthalene	91-57-6	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachlorocyclopentadiene	77-47-4	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4,6-Trichlorophenol	88-06-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4,5-Trichlorophenol	95-95-4	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
2-Chloronaphthalene	91-58-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2-Nitroaniline	88-74-4	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
Dimethylphthalate	131-11-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Acenaphthylene	208-96-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
3-Nitroaniline	99-09-2	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
Acenaphthene	83-32-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4-Dinitrophenol	51-28-5	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
4-Nitrophenol	100-02-7	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ

9 3 1 2 7 5 1 0 6 9 5

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
EXTRACTION DATE		3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
ANALYSIS DATE		4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
Dibenzofuran	132-64-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,4-Dinitrotoluene	121-14-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
2,6-Dinitrotoluene	606-20-2	1000 UJ	1000 U	NA	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Diethylphthalate	84-66-2	1000UJ*	1000 U*	370 U	1000 UJ	1000 UJ	370 J	1200 UJ	1500UJ*	1000 UJ	1000 UJ
4-Chlorophenyl-phenylether	7005-72-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Fluorene	86-73-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Nitroaniline	100-01-6	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
4,6-Dinitro-2-methylphenol	534-52-1	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
N-Nitrosodiphenylamine	86-30-6	1000 UJ	1000 U	90 J ¹	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
4-Bromophenyl-phenylether	101-55-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Hexachlorobenzene	118-74-1	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Pentachlorophenol	87-86-5	4900 UJ	4900 U	1900 U	5000 UJ	5100 UJ	5000 UJ	5800 UJ	7300 UJ	5000 UJ	5000 UJ
Phenanthrene	85-01-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Anthracene	120-12-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Di-n-Butylphthalate	84-74-2	1000 UJ	1000 U	45 J	1500 UJ	1000 UJ	1400 UJ	1200 UJ	4500 UJ	1000 UJ	1000 UJ
Fluoranthene	206-44-0	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Pyrene	129-00-0	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Butylbenzylphthalate	85-68-7	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00GW3	B00GW4	B00GW5	B00GW8	B00GX6	B00GZ2	B00GZ6	B00GZ8	B00H00	B00H01
TYPE		Reg	Fdup	Split	Reg	Reg	Reg	Reg	Reg	Reg	Reg
POND		3B	3B	3B	3B	3B	3B	3B	3B	3C	3C
DEPTH		13	13	13	21	61.5	90.5	118.5	123.5	1	3
EXTRACTION DATE		3/12/91	3/12/91	3/13/91	3/12/91	3/17/91	3/17/91	3/21/91	4/2/91	3/21/91	3/21/91
ANALYSIS DATE		4/2/91	3/14/91	4/8/91	4/2/91	4/4/91	4/4/91	4/1/91	4/5/91	4/1/91	4/1/91
3,3'-Dichlorobenzidine	91-94-1	2000 UJ	2000 U	740 U	2000 UJ	2100 UJ	2100 UJ	2400 UJ	3000 UJ	2100 UJ	2100 UJ
Benzo(a)anthracene	56-55-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
bis(2-ethylhexyl)phthalate	117-81-7	1000 UJ	1000 U	54 J	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1200 UJ	1600 UJ
Chrysene	218-01-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Di-n-octylphthalate	117-84-0	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(b)fluoranthene	205-99-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(k)fluoranthene	207-08-9	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(a)pyrene	50-32-8	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Dibenz(a,h)anthracene	53-70-3	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
Benzo(g,h,i)perylene	191-24-2	1000 UJ	1000 U	370 U	1000 UJ	1000 UJ	1000 UJ	1200 UJ	1500 UJ	1000 UJ	1000 UJ
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	No	No	No	No	No
Total TICs		6	11	5	13	14	17	11	20	16	17
TICs without laboratory "B" flags		0	4	5	7	5	9	1	1	5	0

MHC-SD-EN-AP-104 Rev. 0

A-47

9 3 1 2 7 6 1 0 6 9 7

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
EXTRACTION DATE		3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
ANALYSIS DATE		4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
Phenol	108-95-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
bis(2-chloroethyl)ether	111-44-4	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Chlorophenol	95-57-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,3-Dichlorobenzene	541-73-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,4-Dichlorobenzene	106-46-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzyl Alcohol	100-51-6	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,2-Dichlorobenzene	95-50-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Methylphenol	95-48-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
bis(2-Chloroisopropyl) ether	108-60-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Methylphenol	106-44-5	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
N-Nitrosodipropylamine	621-64-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachloroethane	67-72-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Nitrobenzene	98-95-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Isophorone	78-59-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Nitrophenol	88-75-5	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4-Dimethylphenol	105-67-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzoic acid	65-85-0	6300 UJ	5000UJ*	5100UJ*	5000UJ*	5100UJ*	1700 U	5300UJ*	4800UJ*	5100UJ*	6200 U*
bis(2-chloroethoxy)methane	111-91-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
EXTRACTION DATE		3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
ANALYSIS DATE		4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
2,4-Dichlorophenol	120-83-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
1,2,4-Trichlorobenzene	120-82-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Naphthalene	91-20-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Chloroaniline	106-47-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachlorobutadiene	87-68-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Chloro-3-methylphenol	59-50-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Methylnaphthalene	91-57-6	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachlorocyclopentadiene	77-47-4	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4,6-Trichlorophenol	88-06-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4,5-Trichlorophenol	95-95-4	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
2-Chloronaphthalene	91-58-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2-Nitroaniline	88-74-4	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
Dimethylphthalate	131-11-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Acenaphthylene	208-96-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
3-Nitroaniline	99-09-2	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
Acenaphthene	83-32-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4-Dinitrophenol	51-28-5	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
4-Nitrophenol	100-02-7	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U

9 3 1 2 7 6 1 0 6 9 9

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
EXTRACTION DATE		3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
ANALYSIS DATE		4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
Dibenzofuran	132-64-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,4-Dinitrotoluene	121-14-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
2,6-Dinitrotoluene	606-20-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	NA	1100 UJ	990 UJ	1100 UJ	1300 U
Diethylphthalate	84-66-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000UJ*	340 U	1100UJ*	990 UJ	1100 UJ	1300 U*
4-Chlorophenyl-phenylether	7005-72-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Fluorene	86-73-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
4-Nitroaniline	100-01-6	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
4,6-Dinitro-2-methylphenol	534-52-1	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
N-Nitrosodiphenylamine	86-30-6	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U ¹	1100 UJ	990 UJ	1100 UJ	1300 U
4-Bromophenyl-phenylether	101-55-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Hexachlorobenzene	118-74-1	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Pentachlorophenol	87-86-5	6300 UJ	5000 UJ	5100 UJ	5000 UJ	5100 UJ	1700 U	5300 UJ	4800 UJ	5100 UJ	6200 U
Phenanthrene	85-01-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Anthracene	120-12-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Di-n-Butylphthalate	84-74-2	2000 UJ	1500 UJ	2500 UJ	2100 UJ	3100 UJ	340 U	2500 UJ	1100 UJ	2200 UJ	3700 U
Fluoranthene	206-44-0	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Pyrene	129-00-0	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Butylbenzylphthalate	85-68-7	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U

Table A-6. B-Pond Phase 3 Semivolatiles. ($\mu\text{g/Kg}$)
(Base/Neutral/Acid Compounds)

ANALYTE	CAS#	B00H02	B00H03	B00H04	B00H05	B00H06	B00H07	B00H14	B00H10	B00H19	B00H23
TYPE		Reg	Reg	Reg	Fdup	Reg	Split	Reg	Blank	Reg	Reg
POND		3C	3C	3C	3C	3C	3C	3C	3C	3C	3C
DEPTH		5	7	9	9	11.5	11.5	30	---	60	80
EXTRACTION DATE		3/21/91	4/2/91	4/2/91	4/2/91	4/2/91	3/21/91	4/2/91	4/2/91	4/2/91	4/2/91
ANALYSIS DATE		4/1/91	4/5/91	4/5/91	4/5/91	4/5/91	4/26/91	4/5/91	4/5/91	4/5/91	4/5/91
				*							
3,3'-Dichlorobenzidine	91-94-1	2600 UJ	2100 UJ	2100 UJ	2100 UJ	2100 UJ	690 U	2200 UJ	2000 UJ	2100 UJ	2500 U
Benzo(a)anthracene	56-55-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
bis(2-ethylhexyl)phthalate	117-81-7	1400 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Chrysene	218-01-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Di-n-octylphthalate	117-84-0	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(b)fluoranthene	205-99-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(k)fluoranthene	207-08-9	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(a)pyrene	50-32-8	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Indeno(1,2,3-cd)pyrene	193-39-5	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Dibenz(a,h)anthracene	53-70-3	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
Benzo(g,h,i)perylene	191-24-2	1300 UJ	1000 UJ	1000 UJ	1000 UJ	1000 UJ	340 U	1100 UJ	990 UJ	1100 UJ	1300 U
OTHER WAC-173-303-9905 DANGEROUS WASTE CONSTITUENTS?		No	No	No	No	No	No	No	No	No	No
Total TICs		18	21	21	20	21	5	21	21	19	20
TICs without laboratory "B" flags		1	4	3	2	2	5	4	4	2	4

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

* NOTE: Analyte was qualified as non-detected at the adjusted CRQL due to traces in immediate laboratory blank and sample however, other samples analyzed at that laboratory are reported in this table at sub-CRQL concentrations.

1 Cannot be separated from Diphenylamine.

WMC-SD-EN-AP-104 Rev. 0

**Reasons for Westinghouse Hanford Company Qualification--
Semivolatile Organic (Base/Neutral/Acid) Compounds**

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All samples were flagged as estimated, "J". The following samples were qualified "J" based on extraction outside 7-day criteria established for water. (All samples were analyzed within 40 days of extraction.)

B00FK6	B00GR9	B00GX6	B00H04
B00FK7	B00GS4	B00GZ2	B00H05
B00FK8	B00GS9	B00GZ6	B00H06
B00FK9	B00GT7	B00GZ8	B00H10
B00FL0	B00GV5	B00H00	B00H14
B00FL1	B00GW1	B00H01	B00H19
B00FL3	B00GW3	B00H02	
B00FL4	B00GW8	B00H03	

LABORATORY BLANK--The target compounds diethyl phthalate bis(2-ethylhexyl) phthalate, di-n-butyl phthalate and benzoic acid were detected in laboratory blanks. This resulted in an undetected qualification, "U", of one or more of those analytes detected at similar concentrations in the following:

B00FK6	B00GS9	B00GW4	B00H04
B00FK7	B00GT7	B00GW8	B00H05
B00FK8	B00GV5	B00GX6	B00H06
B00FK9	B00GV6	B00GZ2	B00H10
B00FL0	B00GV7	B00GZ6	B00H14
B00FL1	B00GV8	B00GZ8	B00H19
B00FL3	B00GV9	B00H00	B00H23
B00FL4	B00GW0	B00H01	
B00GR9	B00GW1	B00H02	
B00GS4	B00GW3	B00H03	

Blank qualification criteria were also applied to compounds reported as TICs. The TICs were not reported when present in similar concentrations in the immediately associated laboratory blank.

Split Samples:

LABORATORY BLANKS--The compounds di-n-butylphthalate, fluoranthene, pyrene, butylbenzylphthalate, and bis(2-ethylhexyl)phthalate were detected at sub-CRQL levels in the laboratory blank associated with B00GS5. Similar levels in sample B00GS5 were qualified "U" at the quantitation limit.

Additional notes :

The split samples B00GS5, B00GW5, and B00H07 had a pH reported in conjunction with the semivolatile analysis. Reported values were 7.1, 7.2, and 6.3, respectively.

A listing of semivolatile TICs follows in Table A-7.

9 3 1 2 7 6 1 0 7 0 2

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds.
Laboratory Reported Compounds Not in the Associated Lab Blank
(6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00FK6	Diethyl Adipate	123-79-5	630 J
	Unknown		1400 J
	Unknown		960 J
B00FK7	Benzaldehyde, 5-hydroxy-3-metho	121-33-5	550 J
	2-Pyrrolidinone, 1-methyl-	872-50-4	610 J
	Unknown		900 J
B00FK8	Unknown Hydrocarbons		5400 J
	Unknown Hydrocarbons		1100 J
	Unknown		1500 J
	Unknown		500 J
B00FK9	Octanoic Acid	124-07-2	460 J
	Unknown		1400 J
B00FL0	Unknown Hydrocarbon		2800 J
	Unknown Hydrocarbon		810 J
	Unknown		520 J
	Unknown		1500 J
	Unknown		490 J
B00FL1	Dimethyl Hydrazine		600 JY
	Unknown Hydrocarbon		530 J
	Unknown		1500 J
	Unknown		1700 J
	Unknown		620 J
B00FL3	None		
B00FL4	Benzaldehyde, 5-hydroxy-3-metho	121-33-5	480 J
	Phosphoric acid, Dioctadecyl e		470 J
	Unknown		1200 J
	Unknown		1600 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds.
Laboratory Reported Compounds Not in the Associated Lab Blank
(6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GR9	Benzaldehyde, 5-hydroxy-3-metho	121-33-5	450 J
	Dimethyl Hydrazine		460 J
	Unknown		630 J
	Unknown		440 J
	Unknown		790 J
	Unknown		640 J
B00GS4	Phosphoric acid, Dioctadecyl e		1200 J
	Unknown Hydrocarbon		1700 J
	Unknown		1300 J
	Unknown		650 J
B00GS5	None		
B00GS9	Butyl Cellosolve	111-76-2	690 J
	Unknown		470 J
	Unknown		1400 J
	Unknown		490 J
B00GT7	Unknown Hydrocarbon		3000 J
	Unknown Phthalate ester		470 J
	Unknown		780 J
	Unknown		2000 J
	Unknown		820 J
	Unknown		2300 J
	Unknown		550 J
	Unknown		1600 J
	Unknown		1400 J
	Unknown		1400 J
	Unknown		2000 J
B00GV5	Unknown		780 J
	Unknown		1400 J
	Unknown		640 J
	Unknown		790 J

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Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds.
Laboratory Reported Compounds Not in the Associated Lab Blank
(6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GV6	2-Pyrrolidinone, 1-methyl-	872-50-4	620 J
	Isoheptdecanol		1800 J
	Sat'd. Hydrocarbon		1200 J
	Sat'd. Hydrocarbon		1100 J
	Sat'd. Hydrocarbon		570 J
	Sat'd. Hydrocarbon		670 J
	Sat'd. Hydrocarbon		1300 J
	Unknown		1200 J
	Unknown		920 J
B00GV7	Hexadecanoic acid	57-10-3	1500 J
	Tetradecanoic acid, tetradecyl	3234-85-3	520 J
B00GV8	Pentadecanoic acid	1002-84-2	820 J
	Unknown		640 J
B00GV9	Unknown Alkoxy Cpd		1800 J
	Unknown Alkyl Hydrocarbon		1800 J
	Unknown Alkyl Hydrocarbon		440 J
	Unknown Phthalate ester		890 J
	Unknown		400 J
	Unknown		4800 J
	Unknown		490 J
	Unknown		850 J
B00GW0	Unknown Alkyl Hydrocarbon		470 J
	Unknown Alkyl Hydrocarbon		1200 J
	Unknown Alkyl/Alkoxy Cpd		990 J
	Unknown Alkyl/Alkoxy Cpd		2300 J
B00GW1	Unknown Alkoxy Cpd		860 J
	Unknown Alkyl Hydrocarbon		1500 J
B00GW3	None		

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds.
Laboratory Reported Compounds Not in the Associated Lab Blank
(6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GW4	Unknown Alkyl/Alkoxy Cpd		1000 J
	Unknown Alkyl/Alkoxy Cpd		2300 J
	Unknown Phthalate ester		460 J
	Unknown		440 J
B00GW5	Adipate		10000 J
	Aldol condensate		200 JA
	Aldol condensate		600 JA
	Unknown		200 J
	Unknown		1000 J
B00GW8	Unknown Alkoxy Cpd		670 J
	Unknown Alkyl Hydrocarbon		1000 J
	Unknown Alkyl Hydrocarbon		450 J
	Unknown Phthalate ester		610 J
	Unknown		3600 J
	Unknown		450 J
	Unknown		470 J
B00GX6	1-Dotriacontanol		3100 J
	Sat'd. Hydrocarbon		740 J
	Unknown Alkyl Hydrocarbon		3600 J
	Unknown Alkyl Hydrocarbon		1300 J
	Unknown		830 J
B00GZ2	3-Eicosene, (e)-		7900 J
	7 Hexadecane, (2)-		500 J
	1-Propanol, 2-ethoxy-		850 J
	Unknown Alkyl Hydrocarbon		3300 J
	Unknown Alkyl Hydrocarbon		1400 J
	Unknown Hydrocarbon		500 J
	Unknown Hydrocarbon		520 J
	Unknown Hydrocarbon		4600 J
	Unknown		980 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds.
Laboratory Reported Compounds Not in the Associated Lab Blank
(6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00GZ6	Unknown		1400 J
B00GZ8	Unknown Alkyl Hydrocarbon		2600 J
B00H00	Unknown Hydrocarbon		1200 J
	Unknown Hydrocarbon		3800 J
	Unknown Hydrocarbon		1600 J
	Unknown Hydrocarbon		910 J
	Unknown		590 J
B00H01	None		
B00H02	Unknown		790 J
B00H03	bis(2-Methoxyethyl)ester	117-82-8	860 J
	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	2600 J
	Unknown Alkyl Hydrocarbon		900 J
	Unknown Hydrocarbon		1200 J
B00H04	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	4100 J
	Unknown Hydrocarbon		960 J
	Unknown		1100 J
B00H05	bis(2-Methoxyethyl)ester	117-82-8	790 J
	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	2300 J
B00H06	Unknown Alkyl Hydrocarbon		1000 J
	Unknown Hydrocarbon		940 J
B00H07	Adipate		6000 J
	Aldol condensate		200 JA
	Phthalate		100 J
	Unknown Hydrocarbon		200 J
	Unknown		200 J

Table A-7. B-Pond Phase 3 Semivolatile Tentatively Identified Compounds.
Laboratory Reported Compounds Not in the Associated Lab Blank
(6 sheets)

SAMPLE	REPORTED COMPOUND	CAS#	CONCENTRATION
B00H14	Propanoic acid, 2-methyl-, 2,2-D		1200 J
	Unknown Hydrocarbon		780 J
	Unknown		800 J
	Unknown		890 J
B00H10	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	1100 J
	Unknown Alkyl Hydrocarbon		550 J
	Unknown		550 J
	Unknown		2100 J
B00H19	bis(2-Methoxyethyl)ester	117-82-8	880 J
	Propanoic acid, 2-methyl-, 1-(1	74381-40-1	3300 J
B00H23	bis(2-Methoxyethyl)ester	117-82-8	1200 J
	Unknown Hydrocarbon		1100 J
	Unknown Hydrocarbon		1100 J
	Unknown		1100 J

J The associated value is an estimated quantity.

Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb	Ba	Be	B	Cd	Ca
BOOFK6	Reg	3A	6.5	6600	5.6 U	72	0.36	4.5	0.98	3400
BOOFK7	Reg	3A	8.5	6900	5.4 U	81	0.43	8.6	1.2	5300
BOOFK8	Reg	3A	10.5	3800	5.1 U	61	0.36	3.2	1.6	8100
BOOFK9	Reg	3A	13	4500	4.8 U	55	0.31	4.8	0.85	8400
BOOFL0	Reg	3A	14.5	5200	5.1 U	69	0.53	3.5	1.2	9200
BOOFL1	Reg	3A	16	5600	5.4 U	75	0.40	7.4	1.3	12000
BOOFL3	Blank	3A	---	130	5.0 U	1.6	0.03 U	3.7	0.30 U	36
BOOFL4	Reg	3A	28	4700	5.1 U	67	0.38	4.7	0.54	9300
BOOGR9	Fdup	3A	28	3900	5.1 U	54	0.34	5.3	0.72	6900
BOOGS0	Reg	3A	31.5	NA	NA	NA	NA	NA	NA	NA
BOOGS1	Reg	3A	36.5	6100	5.2 U	71	0.41	0.42 U	1.6	12000
BOOGS2	Reg	3A	42	5200	6.5	65	0.35	0.39 U	0.99	7700
BOOGS3	Reg	3A	46.5	5300	5.2 U	72	0.35	0.42 U	0.69	9300
BOOGS4	Reg	3A	52.5	8700	5.5 U	91	0.50	1.3	0.33 U	14000
BOOGS5	Split	3A	52.5	4020	4.0 UJ	75	0.34 B	NA	0.762 U	11600
BOOGS8	Reg	3A	57	4800	4.9 U	66	0.31	0.39 U	0.34	6700
BOOGS9	Reg	3A	66.5	5500	5.9	75	0.35	0.41 U	0.31 U	8000
BOOGT1	Reg	3A	77	9600	5.7 U	83	0.37	0.46 U	0.34 U	11000
BOOGT3	Blank	3A	---	230	4.8 U	4.6	0.029 U	0.38 U	0.29 U	64
BOOGT4	Reg	3A	85.5	6500	5.2 U	56	0.23	8.2	0.49	7400
BOOGT5	Fdup	3A	85.5	6300	5.2 U	52	0.25	8.3	0.58	8300
BOOGT6	Split	3A	85.5	2450	4.0 U	36.3 B	0.21 U	NA	0.83 U	5280
BOOGT7	Reg	3A	97	6600	4.8 U	75	0.28	8.2	0.58	6300

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Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb	Ba	Be	B	Cd	Ca
BOOFK6	Reg	3A	6.5	6600	5.6 U	72	0.36	4.5	0.98	3400
BOOGT8	Reg	3A	102	7600	14	87	0.35	8.0	0.76	7800
BOOGV0	Reg	3A	122	6500	4.6 U	71	0.29	8.8	0.28 U	5800
BOOGV1	Blank	3A	---	300	4.6 U	6.4	0.12	5.9	0.27 U	60
BOOGV2	Reg	3A	131	7400	4.6 U	77	0.30	7.4	0.60	8000
BOOGV3	Fdup	3A	131	7100	5.2 U	110	0.30	9.1	0.64	7600
BOOGV4	Split	3A	131	2590	3.76 U	43.7	0.28 B	NA	0.79 U	3450
BOOGV5	Reg	3A	143.5	6100	8.0	53	0.28	9.3	0.62	6400
BOOGV6	Reg	3B	1	4500	5.0 U	62	0.32	8.7	0.67	6900
BOOGV7	Reg	3B	3.5	5200	4.9 U	70	0.33	7.6	0.50	7700
BOOGV8	Reg	3B	5.5	5300	5.1 U	87	0.35	8.9	0.31 U	7700
BOOGV9	Blank	3B	---	150	5.0 U	2.0	0.03	7.5	0.30 U	37
BOOGW0	Reg	3B	7.5	7200	5.3 U	80	0.40	6.1	0.80	13000
BOOGW1	Reg	3B	9.5	5000	5.1 U	64	0.35	6.6	0.80	8700
BOOGW3	Reg	3B	13	4600	5.0 U	80	0.35	5.8	1.7	7100
BOOGW4	Fdup	3B	13	4900	4.8 U	78	0.35	5.8	0.84	7600
BOOGW5	Split	3B	13	2210	3.89 U	58.3	0.20 U	NA	0.82 U	5220
BOOGW6	Reg	3B	16	7000	5.3 U	75	0.42	8.0	0.90	10000
BOOGW8	Reg	3B	21	6000	5.1 U	76	0.35	7.2	0.80	7600
BOOGW9	Reg	3B	28	6500	5.2 U	96	0.38	8.1	0.60	7300
BOOGX2	Reg	3B	31	5500	5.1 U	65	0.37	6.8	0.96	7200
BOOGX3	Reg	3B	35.5	5700	5.0 U	63	0.33	5.2	1.6	6500
BOOGX4	Reg	3B	40	5600	5.1 U	75	0.37	4.7	1.7	6800

Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb	Ba	Be	B	Cd	Ca
BOOFK6	Reg	3A	6.5	6600	5.6 U	72	0.36	4.5	0.98	3400
BOOGX5	Reg	3B	52	6000	5.1 U	95	0.36	7.1	1.2	6600
BOOGX6	Reg	3B	61.5	5400	5.1 U	75	0.34	4.2	1.5	7700
BOOGX8	Reg	3B	70.5	7400	5.2 U	84	0.32	3.7	1.3	8000
BOOGY0	Blank	3B	---	200	4.9 U	3.6	0.05	6.0	0.29 U	49
BOOGY1	Reg	3B	80.5	8400	5.2 U	80	0.29	12	0.66	8700
BOOGY2	Fdup	3B	80.5	7200	5.2 U	63	0.29	8.7	0.82	8000
*BOOGY9	Split	3B	80.5	2930	12.5 U	43.7	1.0 U	NA	1.0 U	5160
BOOGZ2	Reg	3B	90.5	7300	5.1 U	84	0.31	6.9	1.0	7000
BOOGZ3	Reg	3B	105	6900	5.1 U	66	0.30	5.0	1.1	5800
BOOGZ6	Reg	3B	118.5	17000	5.8 U	88	0.88	7.6	1.3	5000
BOOGZ8	Reg	3B	123.5	13000	4.9 U	87	0.56	9.5	1.8	3000
BOOH00	Reg	3C	1	6000	5.2 U	53	0.41	8.3	2.0	11000
BOOH01	Reg	3C	3	6200	5.0 U	50	0.36	5.8	1.0	5900
BOOH02	Reg	3C	5	6500	5.2 U	60	0.39	7.7	1.2	6900
BOOH03	Reg	3C	7	5400	5.0 U	88	0.29	11	2.5	6800
BOOH04	Reg	3C	9	6000	5.0 U	92	0.21	12	2.3	7300
BOOH05	Fdup	3C	9	7100	4.9 U	79	0.26	9.4	2.1	7600
BOOH06	Reg	3C	11.5	4900	5.3 U	76	0.30	12	2.3	6800
BOOH07	Split	3C	11.5	2300	4.0 U	57.1	0.36 B	NA	0.8 UJ	4820
BOOH09	Reg	3C	16	4600	5.2 U	170	0.23	14	1.7	5300
BOOH10	Blank	3C	---	260	4.9 U	3.0	0.066	3.4	0.29 U	75
BOOH11	Reg	3C	20.5	4700	5.2 U	69	0.30	0.42 U	1.0	6200

Table A-8a. Analytes by Inductively Coupled Plasma, Aluminum-Calcium. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Al	Sb	Ba	Be	B	Cd	Ca
BOOFK6	Reg	3A	6.5	6600	5.6 U	72	0.36	4.5	0.98	3400
BOOH14	Reg	3C	30	5600	4.8 U	73	0.35	4.9	1.7	6800
BOOH15	Reg	3C	36	6000	5.2 U	56	0.27	10	1.9	6200
BOOH16	Reg	3C	40.5	5500	5.3 U	84	0.26	12	2.3	9400
BOOH17	Fdup	3C	40.5	5500	5.1 U	78	0.32	0.41 U	0.62	5800
BOOH18	Reg	3C	50	5800	5.3 U	69	0.35	0.42 U	1.7	7800
BOOH19	Reg	3C	60	7000	5.3 U	97	0.29	4.5	1.2	6500
BOOH20	Reg	3C	70.5	7300	5.2 U	70	0.33	4.0	1.7	7400
BOOH21	Blank	3C	---	150	5.0 U	2.4	0.04	3.9	0.30 U	92
BOOH23	Reg	3C	80	8300	5.2 U	100	0.37	3.5	1.3	7600
BOOH24	Split	3C	80	3720 J	3.59 UJ	46.8 J	0.21 B	NA	0.756 U	4740 J

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit.
This concentration flag was only reported with split samples.

* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.

NA Analysis not requested.

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Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
BOOFK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
BOOFK7	Reg	3A	8.5	6.6	13	15	26000	5300	390 J	1.1 U
BOOFK8	Reg	3A	10.5	3.3	15	17	29000	5200	400 J	1.0 U
BOOFK9	Reg	3A	13	5.9	12	16	24000	4300	300 J	0.96 U
BOOFL0	Reg	3A	14.5	7.4	14	16	29000	4500	360 J	1.0 U
BOOFL1	Reg	3A	16	5.9	14	21	28000	5100	370 J	1.1 U
BOOFL3	Blank	3A	---	0.99 U	0.50 U	0.40 U	190	19	4.5 J	0.99 U
BOOFL4	Reg	3A	28	3.5	13	17	28000	4000	360 J	1.0 U
BOOGR9	Fdup	3A	28	4.9	13	14	25000	3600	300 J	1.0 U
BOOGS0	Reg	3A	31.5	NA	NA	NA	NA	NA	NA	NA
BOOGS1	Reg	3A	36.5	9.6	13	16	27000	6600	410	1.0 U
BOOGS2	Reg	3A	42	7.7	11	16	26000	5300	300	0.97 U
BOOGS3	Reg	3A	46.5	3.9	12	17	26000	5100	350	1.0 U
BOOGS4	Reg	3A	52.5	8.1	12	20	27000	8700	440	1.1 U
BOOGS5	Split	3A	52.5	0.572 U	10.4	13.8	15700	4670	354 J	NA
BOOGS8	Reg	3A	57	3.5	12	15	24000	4300	300	0.99 U
BOOGS9	Reg	3A	66.5	3.1	12	18	27000	4600	340	1.0 U
BOOGT1	Reg	3A	77	13	8.4	13	19000	6600	360	1.1 U
BOOGT3	Blank	3A	---	0.96 U	0.48 U	0.57	890	38	7.5	0.96 U
BOOGT4	Reg	3A	85.5	11	7.0	12	16000 J	4700	250 J	1.0 U
BOOGT5	Fdup	3A	85.5	9.4	7.4	13	16000 J	4000	260 J	1.0 U
BOOGT6	Split	3A	85.5	0.63 U	3.6 B	4.9 B	5450	1700	140 J	NA
BOOGT7	Reg	3A	97	12	10	16	20000 J	4300	260 J	1.3

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Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
BOOFK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
BOOGT8	Reg	3A	102	16	14	27	29000 J	5500	340 J	1.9
BOOGV0	Reg	3A	122	9.5	12	16	21000 J	3800	250 J	1.1
BOOGV1	Blank	3A	---	0.91 U	0.72	1.4	1300 J	42	13 J	0.91 U
BOOGV2	Reg	3A	131	10	13	23	24000 J	3800	290 J	1.5
BOOGV3	Fdup	3A	131	14	14	22	24000 J	4300	290 J	1.9
BOOGV4	Split	3A	131	2.9	6.3 B	10.1	9140	2210	151	NA
BOOGV5	Reg	3A	143.5	16	14	45	25000 J	5100	280 J	2.4
BOOGV6	Reg	3B	1	8.7	12	16	24000 J	3600	280 J	1.2
BOOGV7	Reg	3B	3.5	8.6	14	17	25000 J	3800	340 J	1.4
BOOGV8	Reg	3B	5.5	14	13	19	26000 J	4000	350 J	1.5
BOOGV9	Blank	3B	---	1.3	0.50 U	5.7	270 J	22	5.4 J	1.00 U
BOOGW0	Reg	3B	7.5	9.7	11	19	23000 J	7000	410 J	1.3
BOOGW1	Reg	3B	9.5	5.1	14	25	28000 J	5000	360 J	1.4
BOOGW3	Reg	3B	13	14	13	19	27000	4900	300	1.0 U
BOOGW4	Fdup	3B	13	7.2	13	18	25000 J	4200	340 J	0.95 U
BOOGW5	Split	3B	13	0.61 U	6.1 B	8.6	9620	1990 J	152	NA
BOOGW6	Reg	3B	16	8.1	14	17	30000 J	5800	400 J	1.1 U
BOOGW8	Reg	3B	21	6.8	14	18	29000 J	4600	360 J	1.0 U
BOOGW9	Reg	3B	28	9.4	15	21	29000 J	4200	340 J	1.0
BOOGX2	Reg	3B	31	7.6	14	17	27000 J	3800	320 J	1.0
BOOGX3	Reg	3B	35.5	9.6	13	18	24000	3800	270	1.0 U
BOOGX4	Reg	3B	40	5.9	14	19	27000	4600	310	1.0 U

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Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
BOOFK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
BOOGX5	Reg	3B	52	11	13	21	27000	4200	300	1.5
BOOGX6	Reg	3B	61.5	11	12	17	25000	4400	310	1.2
BOOGX8	Reg	3B	70.5	11	9.5	14	21000	4800	300	1.0 U
BOOGY0	Blank	3B	---	0.98 U	0.49 U	1.5	970 J	32	18 J	0.98 U
BOOGY1	Reg	3B	80.5	19	9.1	26	30000 J	4300	370 J	2.0
BOOGY2	Fdup	3B	80.5	17	8.9	22	29000 J	4400	350 J	1.4
*BOOGY9	Split	3B	80.5	2.1	10.4 U	10.9	9600	2530	183	NA
BOOGZ2	Reg	3B	90.5	18	12	33	26000 J	3900	300 J	1.9
BOOGZ3	Reg	3B	105	20	11	19	22000	4600	280	1.4
BOOGZ6	Reg	3B	118.5	25	9.5	19	23000	8400	270	1.2 U
BOOGZ8	Reg	3B	123.5	18	7.3	13	17000	6000	270	0.99 U
BOOH00	Reg	3C	1	6.0	13	17	28000	5000	370	1.0 U
BOOH01	Reg	3C	3	11	11	19	23000	4600	290	1.0 U
BOOH02	Reg	3C	5	13	14	26	29000	5000	350	1.8
BOOH03	Reg	3C	7	7.6	13	16	25000	4500	300	1.0 U
BOOH04	Reg	3C	9	11	13	18	26000	4500	320	2.2
BOOH05	Fdup	3C	9	20	12	16	22000	5500	300	1.0
BOOH06	Reg	3C	11.5	4.1	15	17	30000	5000	400	1.1 U
BOOH07	Split	3C	11.5	0.634 U	6 B	9.4	11400	2350	172	NA
BOOH09	Reg	3C	16	4.6	10	13	21000	3700	250	1.0 U
BOOH10	Blank	3C	---	0.98 U	0.49 U	0.39 U	650	44	12	0.98 U
BOOH11	Reg	3C	20.5	5.7	13	14	25000	3900	300	1.0 U

Table A-8b. Analytes by Inductively Coupled Plasma, Chromium-Molybdenum. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Cr	Co	Cu	Fe	Mg	Mn	Mo
BOOFK6	Reg	3A	6.5	7.4	9.4	10	19000	3900	330 J	1.1 U
BOOH14	Reg	3C	30	5.7	12	17	26000	4100	290	0.97 U
BOOH15	Reg	3C	36	7.1	12	15	23000	3700	280	1.0 U
BOOH16	Reg	3C	40.5	6.3	13	15	26000	4300	290	1.1 U
BOOH17	Fdup	3C	40.5	11	14	19	25000	4800	310	1.0 U
BOOH18	Reg	3C	50	7.3	16	17	31000	4900	390	1.2
BOOH19	Reg	3C	60	11	8.1	15	17000	4200	270	1.3
BOOH20	Reg	3C	70.5	11	11	19	23000	4500	290	1.0 U
BOOH21	Blank	3C	---	7.2	0.50 U	0.40 U	270	45	6.9	0.99 U
BOOH23	Reg	3C	80	27	12	23	25000	5800	310	1.0 U
BOOH24	Split	3C	80	8.5 J	8.1 B	12.7	13600 J	3230 J	189 J	NA

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit.
This concentration flag was only reported with split samples.

* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.

NA Analysis not requested.

Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
BOOFK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
BOOFK7	Reg	3A	8.5	10	1200	540	0.64 U	240	67	51
BOOFK8	Reg	3A	10.5	5.9	590	550	0.61 U	230	81	51
BOOFK9	Reg	3A	13	7.7	560	320	0.58 U	230	59	45
BOOFL0	Reg	3A	14.5	10	600	500	0.62 U	290	86	54
BOOFL1	Reg	3A	16	7.5	840	510	0.64 U	320	81	55
BOOFL3	Blank	3A	---	0.99 U	59 U	58	0.59 U	20	0.50 U	2.1
BOOFL4	Reg	3A	28	6.4	530	370	0.62	220	78	48
BOOGR9	Fdup	3A	28	6.4	530	370	0.61 U	240	78	47
BOOGS0	Reg	3A	31.5	NA	NA	NA	NA	NA	NA	NA
BOOGS1	Reg	3A	36.5	15	900	400	1.5	280	68	56
BOOGS2	Reg	3A	42	13	750	330	1.0	270	68	52
BOOGS3	Reg	3A	46.5	12	800	280	1.1	280	68	51
BOOGS4	Reg	3A	52.5	12	1500	480	1.1	250	58	60
BOOGS5	Split	3A	52.5	6.6 B	1110 U	NA	0.952 U	131 B	18.2	32.4
BOOGS8	Reg	3A	57	7.1	670	310	0.66	330	62	45
BOOGS9	Reg	3A	66.5	7.0	710	270	0.77	310	74	52
BOOGT1	Reg	3A	77	16	1800	450	0.83	180	41	42
BOOGT3	Blank	3A	---	0.96 U	57 U	87	0.57 U	16	0.48 U	0.6
BOOGT4	Reg	3A	85.5	11	1000	440	0.63 U	200	38	34
BOOGT5	Fdup	3A	85.5	10	830	550	0.62 U	160	40	33
BOOGT6	Split	3A	85.5	3.6 B	420 U	NA	0.83 U	90.3 B	7.6 B	12.4
BOOGT7	Reg	3A	97	10	800	470	0.58 U	540	52	37

Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
BOOFK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
BOOGT8	Reg	3A	102	15	1100	560	0.61 U	740	73	51
BOOGV0	Reg	3A	122	11	930	450	0.56 U	490	56	42
BOOGV1	Blank	3A	---	0.91 U	83	82	0.55 U	58	3.1	7.4
BOOGV2	Reg	3A	131	9.8	870	330	0.56 U	810	65	43
BOOGV3	Fdup	3A	131	16	860	510	0.62 U	770	61	43
BOOGV4	Split	3A	131	6.1 B	390 B	NA	0.79 U	341	15.4	15.6
BOOGV5	Reg	3A	143.5	24	550	320	0.65 U	600	69	45
BOOGV6	Reg	3B	1	8.2	680	340	0.60 U	320	64	48
BOOGV7	Reg	3B	3.5	8.9	660	330	0.58 U	360	72	50
BOOGV8	Reg	3B	5.5	13	670	360	0.62 U	340	70	52
BOOGV9	Blank	3B	---	1.4	60 U	110	0.60 U	34	0.50 U	4.1
BOOGW0	Reg	3B	7.5	11	1300	260	0.64 U	210	52	48
BOOGW1	Reg	3B	9.5	8.2	780	280	0.61 U	230	78	50
BOOGW3	Reg	3B	13	11	850	300	0.60 U	340	71	46
BOOGW4	Fdup	3B	13	8.8	670	220	0.57 U	280	76	45
BOOGW5	Split	3B	13	4.3 B	491 B	NA	0.82 U	132 B	11.3	17.7
BOOGW6	Reg	3B	16	10	870	300	0.63 U	260	82	51
BOOGW8	Reg	3B	21	8.3	740	240	0.61 U	450	76	50
BOOGW9	Reg	3B	28	11	730	240	0.62 U	560	87	50
BOOGX2	Reg	3B	31	8.9	660	250	0.62 U	390	82	49
BOOGX3	Reg	3B	35.5	9.2	710	290	0.60 U	520	77	44
BOOGX4	Reg	3B	40	10	780	410	0.61 U	420	76	46

9 3 1 2 7 5 1 0 7 1 9

Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
BOOFK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
BOOGX5	Reg	3B	52	9.7	910	390	0.62 U	550	72	46
BOOGX6	Reg	3B	61.5	12	770	450	0.61 U	420	68	43
BOOGX8	Reg	3B	70.5	12	1200	400	0.62 U	450	54	40
BOOGY0	Blank	3B	---	0.99	65	100	0.59 U	51	0.59	3.3
BOOGY1	Reg	3B	80.5	12	970	290	0.62 U	610	45	40
BOOGY2	Fdup	3B	80.5	14	1100	260	0.65	410	45	36
*BOOGY9	Split	3B	80.5	8.3 U	1040 U	NA	2.1 U	1040 U	15.0	17.3
BOOGZ2	Reg	3B	90.5	13	780	250	0.61 U	710	67	40
BOOGZ3	Reg	3B	105	15	1200	430	0.61 U	500	58	39
BOOGZ6	Reg	3B	118.5	21	3000	430	0.70 U	210	38	56
BOOGZ8	Reg	3B	123.5	14	2000	290	0.59 U	180	34	43
BOOH00	Reg	3C	1	9.4	1100	350	0.62 U	560	77	51
BOOH01	Reg	3C	3	11	830	460	0.60 U	470	62	41
BOOH02	Reg	3C	5	13	970	300	0.62 U	620	78	57
BOOH03	Reg	3C	7	10	940	410	0.60 U	450	62	49
BOOH04	Reg	3C	9	11	960	290	0.60 U	510	69	49
BOOH05	Fdup	3C	9	29	790	260	0.59 U	540	58	39
BOOH06	Reg	3C	11.5	7.0	670	290	0.63 U	390	85	54
BOOH07	Split	3C	11.5	5.0 B	256 B	NA	0.85 U	263 U	17.3	19.3
BOOH09	Reg	3C	16	6.8	550	290	0.62 U	310	55	38
BOOH10	Blank	3C	---	0.98 U	59 U	100	0.59 U	31	0.53	5.5
BOOH11	Reg	3C	20.5	14	630	270	0.62 U	270	68	47

Table A-8c. Analytes by Inductively Coupled Plasma, Nickel-Zinc. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ni	K	Si	Ag	Na	V	Zn
BOOFK6	Reg	3A	6.5	8.5	1400	860	0.67 U	170	45	42
BOOH14	Reg	3C	30	9.6	860	260	0.58 U	440	69	49
BOOH15	Reg	3C	36	7.9	720	250	0.62 U	520	60	42
BOOH16	Reg	3C	40.5	12	750	270	0.64 U	510	72	46
BOOH17	Fdup	3C	40.5	14	670	300	0.61 U	440	68	45
BOOH18	Reg	3C	50	8.9	770	370	0.64 U	430	85	54
BOOH19	Reg	3C	60	11	1100	430	0.63 U	410	38	34
BOOH20	Reg	3C	70.5	10	1100	310	0.62 U	570	63	41
BOOH21	Blank	3C	---	4.1	60 U	76	0.60 U	56	0.50 U	2.2
BOOH23	Reg	3C	80	18	1000	350	0.63 U	730	61	42
BOOH24	Split	3C	80	9.5	694 B	NA	1.1 B	275 B	23	23.5

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit.
This concentration flag was only reported with split samples.

* As reported by laboratory--unvalidated by WMC Office of Sample Management. "J" or additional qualification flags may be added.

NA Analysis not requested.

Reasons for Westinghouse Hanford Company Qualification-- Analytes by Inductively Coupled Plasma (Aluminum-Zinc)

Regular, Field Duplicate, and Silica Sand Samples:

MATRIX SPIKE--The spike recovery for Mg and Fe was high for several batches. This resulted in an estimated, "J", qualification for samples in those batches. Affected samples are:

B00FK6	B00GT4	B00GV6	B00GY0
B00FK7	B00GT5	B00GV7	B00GY1
B00FK8	B00GT7	B00GV8	B00GY2
B00FK9	B00GT8	B00GV9	B00GZ2
B00FL0	B00GV0	B00GW0	B00GW9
B00FL1	B00GV1	B00GW1	B00GX2
B00FL3	B00GV2	B00GW4	
B00FL4	B00GV3	B00GW6	
B00GR9	B00GV5	B00GW8	

Split Samples:

LABORATORY BLANKS--B00GS5, B00GT6 and B00GW5 were qualified as undetected, "U", for K based on traces in the associated blanks. Sample B00H07 was likewise qualified for Na because contamination was present in the associated blank. (Blank concentrations were less than the CLP CRQL.)

INDUCTIVELY COUPLED PLASMA (ICP) INTERFERENCE CHECK SAMPLE--B00GS5, B00H07, B00H24, B00GT6 and B00GW5 Mn results were qualified as estimated, "J", because of the possibility of false positive results. A "UJ" qualified Sb results for B00H24 and B00GS5 because of the potential for false negative results from interference. Sodium results for B00GV4 were qualified "J", because of the possibility of false positive results.

MATRIX SPIKE--The Cd and Mn results for B00H07 were qualified "UJ" and "J", respectively because of associated low matrix spike recoveries. The Sb results for B00H24 and B00GS5 were qualified "UJ" because of low spike recoveries (<75%).

DUPLICATE ANALYSIS--Barium and Cr results of sample B00H24 were qualified because of variability among duplicate analyses.

SERIAL DILUTION--Several major soil elements (Al, Fe, Mn, Ca, and Mg) were qualified as estimated, "J", for B00H24 because of serial dilution results differed from initial sample results by >10%.

Table A-9. Analytes by Atomic Absorption Spectroscopy. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic	Lead	Mercury	Selenium	Thallium
BOOFK6	Reg	3A	6.5	2.6	5.1	1.0 UJ	0.54 U	1.1 U
BOOFK7	Reg	3A	8.5	2.86	5.1	1.0 UJ	0.54 U	1.1 U
BOOFK8	Reg	3A	10.5	1.8	3.12	1.0 UJ	0.50 U	0.99 U
BOOFK9	Reg	3A	13	2.0	3.83	1.0 UJ	0.52 U	1.0 U
BOOFL0	Reg	3A	14.5	1.7	3.18	1.0 UJ	0.52 U	1.0 U
BOOFL1	Reg	3A	16	2.6	4.0	1.0 U	0.50 U	0.99 U
BOOFL3	Blank	3A	---	0.49 U	0.39 U	1.0 U	0.49 U	1.0 U
BOOFL4	Reg	3A	28	1.3	2.6	1.0 U	1.0 U	1.0 U
BOOGR9	Fdup	3A	28	1.1	2.6	1.0 U	0.46 U	0.92 U
BOOGS0	Reg	3A	31.5	0.97	3.0	1.0 U	NA	NA
BOOGS1	Reg	3A	36.5	2.1	4.2	1.0 U	NA	NA
BOOGS2	Reg	3A	42	1.5	2.6	1.0 U	NA	NA
BOOGS3	Reg	3A	46.5	1.9	3.1	1.0 U	NA	NA
BOOGS4	Reg	3A	52.5	4.2	11	1.0 U	1.1 UD	1.1 U
BOOGS5	Split	3A	52.5	4.4	8.7 J	0.12 U	0.348 UJ	0.696 UJ
BOOGS8	Reg	3A	57	1.5	2.5	1.0 U	NA	NA
BOOGS9	Reg	3A	66.5	1.3	2.8	1.0 U	0.99 UD	0.99 U
BOOGT1	Reg	3A	77	1.2	5.1	1.0 U	1.1 UD	1.1 U
BOOGT3	Blank	3A	---	0.44 U	0.45	1.0 U	NA	NA
BOOGT4	Reg	3A	85.5	1.6	2.1	1.0 U	NA	NA
BOOGT5	Fdup	3A	85.5	1.7	2.5	1.0 U	NA	NA
BOOGT6	Split	3A	85.5	0.42 UJ	2.5	0.11 UJ	NA	NA
BOOGT7	Reg	3A	97	1.2	4.3	1.0 U	0.49 U	0.97 U

9 3 1 2 7 6 1 0 7 2 3

Table A-9. Analytes by Atomic Absorption Spectroscopy. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic	Lead	Mercury	Selenium	Thallium
BOOGT8	Reg	3A	102	1.5	9.3	1.0 U	NA	NA
BOOGV0	Reg	3A	122	0.94	2.8	1.0 U	NA	NA
BOOGV1	Blank	3A	---	0.5 U	0.52	1.0 U	0.50 U	NA
BOOGV2	Reg	3A	131	0.79	5.0	1.0 U	NA	NA
BOOGV3	Fdup	3A	131	0.82	4.6	1.0 U	NA	NA
BOOGV4	Split	3A	131	0.6 B	7.3	0.1 U	NA	NA
BOOGV5	Reg	3A	143.5	0.94	18	1.0 U	0.54 U	1.1 U
BOOGV6	Reg	3B	1	1.0	2.6	1.0 U	0.50 U	1.0 U
BOOGV7	Reg	3B	3.5	2.0	3.4	1.0 U	0.52 U	1.0 U
BOOGV8	Reg	3B	5.5	1.6	3.5	1.0 U	0.52 U	1.1 U
BOOGV9	Blank	3B	---	0.5 U	0.50	1.0 UJ	0.05 U	1.0 U
BOOGW0	Reg	3B	7.5	7.1	13	1.0 UJ	0.53 U	1.1 U
BOOGW1	Reg	3B	9.5	3.7	4.1	1.0 UJ	0.50 U	1.0 U
BOOGW3	Reg	3B	13	6.6	3.2	1.0 UJ	0.51 U	1.0 U
BOOGW4	Fdup	3B	13	2.4	3.6	1.0 UJ	0.51 U	1.0 U
BOOGW5	Split	3B	13	1.0 J	0.36 U	0.1 UJ	0.32 U	0.89 U
BOOGW6	Reg	3B	16	2.6	4.7	1.0 UJ	NA	NA
BOOGW8	Reg	3B	21	2.2	3.0	1.0 UJ	0.52 U	1.0 U
BOOGW9	Reg	3B	28	1.2	2.9	1.0 UJ	NA	NA
BOOGX2	Reg	3B	31	0.93	3.0	1.0 UJ	NA	NA
BOOGX3	Reg	3B	35.5	0.68	2.3	1.0 U	NA	NA
BOOGX4	Reg	3B	40	0.82	2.5	1.0 U	NA	NA
BOOGX5	Reg	3B	52	0.90	2.7	1.0 U	NA	NA

Table A-9. Analytes by Atomic Absorption Spectroscopy. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic	Lead	Mercury	Selenium	Thallium
BOOGX6	Reg	3B	61.5	0.61	2.2	1.0 U	0.52 U	1.0 U
BOOGX8	Reg	3B	70.5	1.5	3.1	1.0 U	NA	NA
BOOGY0	Blank	3B	---	0.5 U	0.43	1.0 U	NA	NA
BOOGY1	Reg	3B	80.5	1.6	20	1.0 U	NA	NA
BOOGY2	Fdup	3B	80.5	1.9	8.8	1.0 U	NA	NA
*BOOGY9	Split	3B	80.5	1.9 U	7.1	0.56	NA	NA
BOOGZ2	Reg	3B	90.5	1.2	9.9	1.0 U	0.51 U	1.0 U
BOOGZ3	Reg	3B	105	0.98	2.9	1.0 U	NA	NA
BOOGZ6	Reg	3B	118.5	0.59 U	8.5	1.0 U	0.54 U	1.0 U
BOOGZ8	Reg	3B	123.5	7.2	7.2	1.0 U	0.61 U	1.2 U
BOOH00	Reg	3C	1	2.5	3.9	1.0 U	0.51 U	1.0 U
BOOH01	Reg	3C	3	1.9	3.1	1.0 U	0.51 U	1.0 U
BOOH02	Reg	3C	5	2.3	30	1.0 U	0.52 U	1.0 U
BOOH03	Reg	3C	7	2.1	2.5	1.0 U	0.52 U	1.0 U
BOOH04	Reg	3C	9	1.8	2.6	1.0 U	0.52 U	1.0 U
BOOH05	Fdup	3C	9	1.3	2.6	1.0 U	0.51 U	1.0 U
BOOH06	Reg	3C	11.5	1.7	2.5	1.0 U	0.52 U	1.0 U
BOOH07	Split	3C	11.5	0.9 B	2.2	0.1 U	0.16 U	8.0 U
BOOH09	Reg	3C	16	0.80	1.9	1.0 U	NA	NA
BOOH10	Blank	3C	---	0.5 U	0.51	0.1 UJ	0.50 U	1.0 U
BOOH11	Reg	3C	20.5	0.82	2.5	0.1 UJ	NA	NA
BOOH14	Reg	3C	30	0.92	2.4	0.1 UJ	0.52 U	1.0 U
BOOH15	Reg	3C	36	0.65	1.8	0.1 UJ	NA	NA

Table A-9. Analytes by Atomic Absorption Spectroscopy. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Arsenic	Lead	Mercury	Selenium	Thallium
BOOH16	Reg	3C	40.5	0.76	2.0	0.1 UJ	NA	NA
BOOH17	Fdup	3C	40.5	0.50 U	1.9	0.1 UJ	NA	NA
BOOH18	Reg	3C	50	0.73	2.1	0.1 UJ	NA	NA
BOOH19	Reg	3C	60	1.4	2.8	0.1 UJ	0.53 U	1.0 U
BOOH20	Reg	3C	70.5	0.88	2.22	0.1 UJ	NA	NA
BOOH21	Blank	3C	---	0.5 U	0.4 U	0.1 UJ	0.50 U	1.0 U
BOOH23	Reg	3C	80	1.4	2.5	0.1 UJ	0.52 U	1.0 U
BOOH24	Split	3C	80	0.66 J	2.1	0.107 UR	NA	NA

U The analyte was undetected at the stated limit.

J The associated value is an estimated quantity.

NA Analysis not requested.

D Sample quantitation may be affected by dilution.

B The reported value is less than the CLP required detection limit, but greater than the instrument detection limit.
This concentration flag was only reported with split samples.

* As reported by laboratory--unvalidated by WHC Office of Sample Management. "J" or additional qualification flags may be added.

R Qualified by WHC Office of Sample Management as unusable.

Reasons for Westinghouse Hanford Company Qualification--
Analytes by Atomic Absorption Spectroscopy

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--All holding time criteria were met except for some mercury samples. Those samples were qualified "UJ". All samples were flagged as estimated, "J". The 28 day criteria established for water was exceeded for the following Phase 3 soil samples:

B00FK6	B00GW1	B00GX2	B00H17
B00FK7	B00GW3	B00H10	B00H18
B00FK8	B00GW4	B00H11	B00H19
B00FK9	B00GW6	B00H14	B00H20
B00FL0	B00GW8	B00H15	B00H21
B00GV9	B00GW9	B00H16	B00H23
B00GW0			

Split Samples:

LABORATORY BLANKS--Selenium results for B00GW5 were qualified as "U" because similar levels were found in the immediately associated laboratory blank.

HOLDING TIME--Mercury sample results for B00GW5 and B00GT6 were qualified because of holding times greater than 28 days. Mercury was not detected in either sample; both were qualified "UJ".

SPIKE RECOVERY--Low percent recovery of spike led Westinghouse Hanford-OSM to qualify As result as estimated, "J" or "UJ" on B00GW5 and B00GT6, respectively. The Pb, Se, and Tl results for B00GS5 were also qualified "J", "UJ", and "UJ", respectively, for spike recoveries outside limits. The Hg results for B00H24 were qualified unusable, "R", because there was no spike recovery.

Table A-10. Miscellaneous Analytes. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia	Chloride	Cyanide	Fluoride	Nitrate	Sulfate	Sulfide
BOOFK6	Reg	3A	6.5	0.001 U	20 U	1.0 UJ	2	20 UJ	20 U	0.1 UJ
BOOFK7	Reg	3A	8.5	0.001 U	20 U	0.12 J	1.4	20 UJ	20 U	0.1 UJ
BOOFK8	Reg	3A	10.5	0.001 U	20 U	1.0 U	0.8	20 UJ	20 U	0.1 UJ
BOOFK9	Reg	3A	13	0.001 U	20 U	1.0 UJ	0.6	20 UJ	20 U	0.1 UJ
BOOFL0	Reg	3A	14.5	0.001 U	20 U	1.0 UJ	0.6	20 UJ	24	0.1 UJ
BOOFL1	Reg	3A	16	0.001 U	20 U	1.0 UJ	0.8	20 UJ	20 U	0.1 UJ
BOOFL3	Blank	3A	---	0.001 U	20 U	1.0 UJ	0.4	20 UJ	20 U	0.1 UJ
BOOFL4	Reg	3A	28	0.001 U	20 U	1.0 UJ	0.6	20 UJ	20 U	0.1 UJ
BOOGR9	Fdup	3A	28	0.001 U	20 U	1.0 UJ	0.6	20 UJ	20 U	0.1 UJ
BOOGS0	Reg	3A	30.5	0.001 U	20 U	NA	1.2	20 UJ	20 U	NA
BOOGS1	Reg	3A	36.5	0.001 U	20 U	NA	2.2	20 UJ	20 U	NA
BOOGS2	Reg	3A	42	0.001 U	20 U	NA	1.0	20 UJ	20 U	NA
BOOGS3	Reg	3A	46.5	0.001 U	20 U	NA	1.0	20 UJ	20 U	NA
BOOGS4	Reg	3A	52.5	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGS5	Split	3A	52.5	NA	NA	0.6 UI	NA	NA	NA	NA
BOOGS8	Reg	3A	57	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGS9	Reg	3A	66.5	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGT1	Reg	3A	77	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGT3	Blank	3A	---	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGT4	Reg	3A	85.5	0.001 U	1 U	NA	2 U	1 UJ	1 U	NA
BOOGT5	Fdup	3A	85.5	0.001 U	1 U	NA	2 U	1 UJ	1 U	NA
BOOGT6	Split	3A	85.5	NA	NA	NA	NA	NA	NA	NA
BOOGT7	Reg	3A	97	0.001 U	1 U	1.0 UJ	2 U	1 UJ	1 U	0.1 U

Table A-10. Miscellaneous Analytes. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia	Chloride	Cyanide	Fluoride	Nitrate	Sulfate	Sulfide
BOOGT8	Reg	3A	102	0.001 U	20 U	NA	2	20 UJ	21	NA
BOOGV0	Reg	3A	122	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGV1	Blank	3A	---	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGV2	Reg	3A	131	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGV3	Fdup	3A	131	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGV4	Split	3A	131	NA	NA	NA	NA	NA	NA	NA
BOOGV5	Reg	3A	143.5	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGV6	Reg	3B	1	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGV7	Reg	3B	3.5	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 U
BOOGV8	Reg	3B	5.5	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 U
BOOGV9	Blank	3B	---	0.001	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGW0	Reg	3B	7.5	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGW1	Reg	3B	9.5	0.001 U	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGW3	Reg	3B	13	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGW4	Fdup	3B	13	0.001 U	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGW5	Split	3B	13	NA	NA	0.5 U	NA	NA	NA	NA
BOOGW6	Reg	3B	16	NA	20 U	NA	2 U	20 UJ	20 U	NA
BOOGW8	Reg	3B	21	0.001 U	20 U	1.0 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOGW9	Reg	3B	28	NA	20 U	NA	2	20 UJ	20 U	NA
BOOGX2	Reg	3B	31	NA	20 U	NA	2 U	20 UJ	20 U	NA
BOOGX3	Reg	3B	35.5	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGX4	Reg	3B	40	0.001 U	20 U	NA	2.6	20 UJ	20 U	NA
BOOGX5	Reg	3B	52	0.001 U	20 U	NA	2.4	20 UJ	20 U	NA

A-79

MHC-SD-EN-AP-104 Rev. 0

Table A-10. Miscellaneous Analytes. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia	Chloride	Cyanide	Fluoride	Nitrate	Sulfate	Sulfide
BOOGX6	Reg	3B	61.5	0.001 U	20 U	0.1 UJ	2.0	20 UJ	20 U	0.1 UJ
BOOGX8	Reg	3B	70.5	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGY0	Blank	3B	---	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOGY1	Reg	3B	80.5	0.001 U	20 U	NA	2 U	20 UJ	39	NA
BOOGY2	Fdup	3B	80.5	0.001 U	20 U	NA	2.0	20 UJ	46	NA
BOOGY9	Split	3B	80.5	NA	NA	NA	NA	NA	NA	NA
BOOGZ2	Reg	3B	90.5	0.001 U	20 U	0.1 UJ	2.2	20 UJ	36	0.1 UJ
BOOGZ3	Reg	3B	105	0.001 U	20 U	NA	2.0	20 UJ	25	NA
BOOGZ6	Reg	3B	118.5	0.001 U	20 U	1.0 UJ	3.0	20 UJ	28	0.1 UJ
BOOGZ8	Reg	3B	123.5	0.001 U	20 U	0.1 UJ	2 U	20 UJ	26	0.1 UJ
BOOH00	Reg	3C	1	0.001 U	20 U	1.0 UJ	2.0	20 UJ	20 U	0.1 UJ
BOOH01	Reg	3C	3	0.001 U	20 U	1.0 UJ	2.2	20 UJ	20 U	0.1 UJ
BOOH02	Reg	3C	5	0.001 U	20 U	1.0 UJ	2.2	20 UJ	20 U	0.1 UJ
BOOH03	Reg	3C	7	0.001 U	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOH04	Reg	3C	9	0.001 U	20 U	0.1 UJ	2 U	20 UJ	26	0.1 UJ
BOOH05	Fdup	3C	9	0.001 U	20 U	0.1 UJ	2 U	20 UJ	21	0.1 UJ
BOOH06	Reg	3C	11.5	0.001 U	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOH07	Split	3C	11.5	NA	NA	0.5 UJ	NA	NA	NA	NA
BOOH09	Reg	3C	16	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA
BOOH10	Blank	3C	---	0.001 UJ	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOH11	Reg	3C	20.5	0.001 UJ	20 U	NA	2 U	20 UJ	20 U	NA
BOOH14	Reg	3C	30	0.001 U	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOH15	Reg	3C	36	0.001 U	20 U	NA	2 U	20 UJ	20 U	NA

9 3 1 2 7 5 1 0 7 3 0

Table A-10. Miscellaneous Analytes. ($\mu\text{g/g}$)

SAMPLE	TYPE	POND	APPROX. DEPTH	Ammonia	Chloride	Cyanide	Fluoride	Nitrate	Sulfate	Sulfide
BOOH16	Reg	3C	40.5	0.001 UJ	20 U	NA	2 U	20 UJ	20 U	NA
BOOH17	Fdup	3C	40.5	0.001 UJ	20 U	NA	2 U	20 UJ	20 U	NA
BOOH18	Reg	3C	50	0.001 UJ	20 U	NA	2 U	20 UJ	20 U	NA
BOOH19	Reg	3C	60	0.001 UJ	20 U	0.17 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOH20	Reg	3C	70.5	0.001 UJ	20 U	NA	2 U	20 UJ	20 U	NA
BOOH21	Blank	3C	---	0.001 UJ	20 U	NA	2 U	20 UJ	20 U	NA
BOOH23	Reg	3C	80	0.001 UJ	20 U	0.1 UJ	2 U	20 UJ	20 U	0.1 UJ
BOOH24	Split	3C	80	NA	NA	NA	NA	NA	NA	NA

U The analyte was undetected at the stated concentration.

J The associated value is an estimated quantity.

NA Analysis not requested.

I Information only, see validation explanations.

A-81

MHC-SD-EN-AP-104 Rev. 0

Reasons for Westinghouse Hanford Company Qualification--
Miscellaneous Analytes

Regular, Field Duplicate, and Silica Sand Samples:

HOLDING TIME--Nitrate holding time of 48 hrs exceeded for all samples. All samples qualified as estimated, "J", for nitrate. Only B00GT7, B00GV7, and B00GV8 were analyzed within 28 days for sulfide. All other samples were qualified as estimated, "J", for sulfide. All samples were qualified as estimated, "J", for cyanide because of holding times in excess of 14 days. A 28 day holding time for ammonia analyses was exceeded for the following samples:

B00H10	B00H17	B00H19	B00H21
B00H11	B00H18	B00H20	B00H23
B00H16			

Split Samples:

MATRIX SPIKE/DUPLICATE--No matrix spike or duplicate results were provided for cyanide in sample B00GS5 or B00H07. The undetected value for B00GS5 was qualified as "UI", or information only while a similar undetected result for B00H07 was qualified as estimated, "UJ".

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Table A-11. List of Radioactivity Data ($\mu\text{Ci/g}$)--Unvalidated.

Sample	Type	Pond	Approx. Depth	Alpha	Alpha Counting Error	Beta	Beta Counting Error	^{90}Sr	^{90}Sr Counting Error	GEA ¹
BOOFK6	Reg	3A	-6.5	5.34	2.9	-0.221	4.8	12.7	0.84	NA
BOOFK7	Reg	3A	-8.5	4.5	2.9	5.0	5.0	3.47	0.51	NA
BOOFK8	Reg	3A	-10.5	3.21	2.8	-0.863	4.8	3.65	0.51	NA
BOOFK9	Reg	3A	-13	2.4	2.7	-2.61	4.8	3.86	0.52	NA
BOOFL0	Reg	3A	-14.5	-2.42	2.3	-9.51	4.5	1.43	4.0	NA
BOOFL1	Reg	3A	-16	2.37	2.7	-1.43	4.8	0.00	0.41	NA
BOOFL3	Blank	3A	---	-0.77	2.4	-10.5	4.4	-0.0686	0.29	NA
BOOFL4	Reg	3A	-28	-1.08	2.4	1.16	4.4	0.226	0.074	NA
BOOGR9	Fdup	3A	-28	-2.44	2.3	-12.6	4.4	3.27	0.50	NA
BOOGS0	Reg	3A	-31.5	-0.309	2.5	-11.3	4.4	NA	NA	NA
BOOGS1	Reg	3A	-36.5	-2.39	2.3	-11.2	4.4	NA	NA	NA
BOOGS2	Reg	3A	-42	-0.337	1.9	2.33	4.7	NA	NA	NA
BOOGS3	Reg	3A	-46.5	1.05	2.1	6.72	4.9	NA	NA	NA
BOOGS4	Reg	3A	-52.5	2.28	2.3	4.82	4.8	0.13	0.46	NA
BOOGS5	Split	3A	-52.5	3.4	1.3	33	2	< 0.04	---	Done
BOOGS8	Reg	3A	-57	0.711	2	3.32	4.7	NA	NA	NA
BOOGS9	Reg	3A	-66.5	1.48	0.48	2.26	0.87	379	330	NA
BOOGT1	Reg	3A	-77	1.67	0.51	3.35	0.93	NA	NA	NA
BOOGT3	Blank	3A	---	0.76	0.11	0.67	0.13	NA	NA	NA
BOOGT4	Reg	3A	-85.5	2.46	2.3	8.24	5.0	NA	NA	NA
BOOGT5	Fdup	3A	-85.5	1.84	2.2	5.49	4.8	NA	NA	NA
BOOGT6	Split	3A	-85.5	< 3	---	19	2	NA	NA	NA
BOOGT7	Reg	3A	-97	1.81	2.2	0.815	4.6	36.1	1.7	Done
BOOGT8	Reg	3A	-102	42.59	5.5	4.94	5.2	NA	NA	NA
BOOGV0	Reg	3A	-122	1.74	1.9	-2.12	4.8	NA	NA	NA
BOOGV1	Blank	3A	---	1.45	1.9	-0.26	4.9	NA	NA	NA
BOOGV2	Reg	3A	-131	1.93	1.9	-0.22	4.9	NA	NA	NA
BOOGV3	Fdup	3A	-131	2.16	2	5.84	5.2	NA	NA	NA
BOOGV4	Split	3A	-131	< 2	---	26	3	NA	NA	NA
BOOGV5	Reg	3A	-143.5	3.52	2.2	7.43	5.3	1.00	0.433	Done
BOOGV6	Reg	3B	-1	2.21	1.7	1.65	4.7	-0.182	0.44	Done
BOOGV7	Reg	3B	-3.5	4.82	2.2	5.78	5.0	1.25	0.55	Done
BOOGV8	Reg	3B	-5.5	1.83	1.7	5.93	5.0	1.14	0.54	Done
BOOGV9	Blank	3B	---	2.95	1.9	-0.72	4.6	-0.016	0.45	Done
BOOGW0	Reg	3B	-7.5	3.27	1.9	8.75	5.1	36.5	1.7	Done

Table A-11. List of Radioactivity Data ($\mu\text{Ci/g}$)--Unvalidated.

Sample	Type	Pond	Approx. Depth	Alpha	Alpha Counting Error	Beta	Beta Counting Error	^{90}Sr	^{90}Sr Counting Error	GEA ¹
BOOGW1	Reg	3B	-9.5	2.43	1.8	3.28	4.8	0.222	0.47	Done
BOOGW3	Reg	3B	-13	1.22	1.6	2.91	3.8	1.55	0.40	Done
BOOGW4	Fdup	3B	-13	4.02	2.1	3.42	4.8	1.06	0.53	Done
BOOGW5	Split	3B	-13	< 1	---	19	2	< 0.04	---	Done
BOOGW6	Reg	3B	-16	3.89	2	6.84	5.0	NA	NA	NA
BOOGW8	Reg	3B	-21	1.43	1.6	0.48	4.7	1.47	0.56	Done
BOOGW9	Reg	3B	-28	1.82	1.7	1.36	4.7	NA	NA	NA
BOOGX2	Reg	3B	-31	4.28	2.1	3.59	4.8	NA	NA	NA
BOOGX3	Reg	3B	-35.5	3.45	2	2.06	3.8	NA	NA	NA
BOOGX4	Reg	3B	-40	2.38	1.8	3.86	3.9	NA	NA	NA
BOOGX5	Reg	3B	-52	3.01	1.9	4.57	3.9	NA	NA	NA
BOOGX6	Reg	3B	-61.5	7.29	2.4	3.74	3.9	1.22	0.38	Done
BOOGX8	Reg	3B	-70.5	2.54	1.8	5.88	4.0	NA	NA	NA
BOOGY0	Blank	3B	---	-0.47	2.3	-0.59	4.1	NA	NA	NA
BOOGY1	Reg	3B	-80.5	-0.94	2.3	4.1	-0.41	NA	NA	NA
BOOGY2	Fdup	3B	-80.5	1.14	2.5	4.57	4.4	NA	NA	NA
BOOGY9	Split	3B	-80.5	2.7	1.2	31	2	NA	NA	NA
BOOGZ2	Reg	3B	-90.5	-2.59	2	3.02	4.3	0.806	0.34	Done
BOOGZ3	Reg	3B	-105	-1.77	2.2	1.37	4.2	NA	NA	NA
BOOGZ6	Reg	3B	-118.5	-0.46	2.3	1.49	4.2	9.17	0.78	Done
BOOGZ8	Reg	3B	-123.5	-2.7	2.3	4.34	4.3	2.43	0.46	Done
BOOH00	Reg	3C	-1	-1.45	2.2	-0.30	4.1	1.31	0.38	Done
BOOH01	Reg	3C	-3	-0.65	2.3	-0.78	4.1	1.37	0.39	Done
BOOH02	Reg	3C	-5	-2.25	2.1	0.30	4.1	2.86	0.049	Done
BOOH03	Reg	3C	-7	-1.71	2.5	2.32	4.2	2.58	0.47	Done
BOOH04	Reg	3C	-9	-1.87	2.4	-1.37	4.0	1.86	0.42	Done
BOOH05	Fdup	3C	-9	-3.21	2.3	0.64	4.1	1.60	0.41	Done
BOOH06	Reg	3C	-11.5	-1.44	2.5	4.56	4.3	1.13	0.37	Done
BOOH07	Split	3C	-11.5	1.9	1	2	25	< 0.04	---	Done
BOOH09	Reg	3C	-16	2.0	1.6	6.94	4.2	NA	NA	NA
BOOH10	Blank	3C	---	0.94	1.4	2.13	4.0	0.101	0.37	Done
BOOH11	Reg	3C	-20.5	3.29	1.8	3.61	4.0	NA	NA	NA
BOOH14	Reg	3C	-30	2.98	1.8	6.59	4.2	0.608	0.41	Done
BOOH15	Reg	3C	-36	-1.11	1	-3.12	3.6	NA	NA	NA
BOOH16	Reg	3C	-40.5	3.02	1.8	4.11	4.1	NA	NA	NA

Table A-11. List of Radioactivity Data ($\mu\text{Ci/g}$)--Unvalidated.

Sample	Type	Pond	Approx. Depth	Alpha	Alpha Counting Error	Beta	Beta Counting Error	^{90}Sr	^{90}Sr Counting Error	GEA ¹
BOOH17	Fdup	3C	-40.5	3.85	1.9	3.51	4.0	NA	NA	NA
BOOH18	Reg	3C	-50	1.86	1.6	3.51	4.0	NA	NA	NA
BOOH19	Reg	3C	-60	0.68	1.4	-1.39	3.7	0.479	0.40	Done
BOOH20	Reg	3C	-70.5	2.66	2	6.38	5.1	NA	NA	NA
BOOH21	Blank	3C	---	2.53	2	-1.47	4.7	NA	NA	NA
BOOH23	Reg	3C	-80	2.46	2	3.29	4.9	2.29	0.52	Done
BOOH24	Split	3C	-80	M	M	M	M	NA	NA	NA

NA Analysis not requested.

M Missing result, figure not available for this report.

--- Result only reported as a "less-than" value--counting error not specified by laboratory.

1. GEA = Gamma Energy Analysis, see Table A-12.

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Radionuclide w/ estimated counting error (Err)

Primary Laboratory

Sample	¹³⁷ Cs	--Err	^{234m} Pa	--Err	²³⁴ Th	--Err	²³⁵ U	--Err
B00GS4	0.602	0.31	26.03	52.7	3.84	6	NR	
B00GS9	0.34	0.2	7.1	33.7	0.94	3.8	NR	
B00GT7	0.0193	0.23	22.73	37.4	0.0945	4.1	NR	
B00GV5	0.136	0.3	55.35	43.2	1.78	5.9	NR	
B00GV6	0.262	0.23	-12	49.7	-1.69	5.9	NR	
B00GV7	0.0374	0.23	-6.03	37.9	-1.95	4.1	NR	
B00GV8	0.446	0.27	21.38	47.3	0.0968	6	NR	
B00GV9	0.31	0.31	-22.05	51	-2.43	5.9	NR	
B00GW1	0.0635	0.24	11.1	40.7	0.702	4.1	NR	
B00GW0	0.0238	0.22	21.3	39.2	-1.13	4.1	NR	
B00GW3	0.259	0.22	29.28	30.8	-0.224	0.37	NR	
B00GW4	0.495	0.27	-24.68	45.6	-0.194	5.9	NR	
B00GW8	-0.0818	0.23	27.83	40	-1.03	4.1	NR	
B00GX6	0.112	0.20	5.83	34.1	7.56	1.8	NR	
B00GZ6	0.32	0.2	25.62	29.4	1.27	3.7	NR	
B00GZ8	0.0241	0.17	15.48	31.1	NR		NR	
B00H00	0.0268	0.18	1.04	31.1	-3.83	2.4	0.308	0.21
B00H01	-0.0589	0.2	10.02	36.5	0.858	3.3	NR	
B00H02	0.0708	0.19	1.04	32.4	-0.149	3.7	NR	
B00H03	-0.113	0.18	-5.18	31.7	NR		NR	
B00H04	0.0924	0.17	44.28	34.6	5.84	2	NR	
B00H05	0.0429	0.20	8.04	36.2	8.28	1.8	NR	
B00H06	0.0193	0.18	54.12	29.9	-1.63	3.8	NR	
B00H10	0.103	1.6	33.9	30.7	6.54	1.6	NR	
B00H14	0.175	0.20	-31.38	33.0	0.373	3.7	NR	
B00H19	0.0433	0.18	6.48	31.8	-0.451	3.8	NR	
B00H23	0.0618	0.19	9.3	32.2	-1.93	2.4	NR	

NR Not Reported.

Table A-12. Gamma Energy Analysis Unvalidated,
Raw Data. (μCi/g)

Radionuclide w/ estimated counting error (Err)

Alternate (Split) Laboratory

<u>Sample</u>	<u>⁴⁰K</u>	<u>--Err</u>	<u>²²⁶Ra</u>	<u>--Err</u>	<u>²²⁸Th</u>	<u>--Err</u>
B00GS5	14	1.4	1.9	0.48	0.864	0.086
B00GW5	9.76	0.98	0.853	0.359	0.42	0.042
B00H07	10.1	1	0.513	0.297	0.557	0.056

Undetected radionuclides reported for the above split samples
as "less-than" the following ($\mu\text{Ci/g-dry}$):

	<u>⁷Be</u>	<u>⁵⁴Mn</u>	<u>⁵⁸Co</u>	<u>⁵⁹Fe</u>	<u>⁶⁰Co</u>	<u>⁶⁵Zn</u>
B00GS5	<1	<0.04	<0.08	<0.4	<0.03	<0.1
B00GW5	<0.8	<0.03	<0.06	<0.3	<0.03	<0.08
B00H07	<0.6	<0.03	<0.05	<0.2	<0.02	<0.08
	<u>⁹⁵Zr</u>	<u>¹⁰³Ru</u>	<u>¹⁰⁶Ru</u>	<u>¹³¹I</u>	<u>¹³⁴Cs</u>	<u>¹³⁷Cs</u>
B00GS5	<0.1	<0.3	<0.03	<2000	<0.04	<0.03
B00GW5	<0.08	<0.2	<0.2	<300	<0.03	<0.02
B00H07	<0.07	<0.1	<0.2	<100	<0.03	<0.02
	<u>¹⁴⁰Ba</u>	<u>¹⁴¹Ce</u>	<u>¹⁴⁴Ce</u>			
B00GS5	<30	<0.6	<0.3			
B00GW5	<10	<0.4	<0.2			
B00H07	<5	<0.2	<0.1			

Table A-12. Gamma Energy Analysis Unvalidated,
Raw Data. ($\mu\text{Ci/g}$)

References

WHC, 1990, WHC-CM-5-3, Westinghouse Hanford Company, Richland, Washington.

EPA, 1986, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, U.S. Environmental Protection Agency, Washington, D.C.

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APPENDIX B

ANALYTE VARIABILITY GRAPHS

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LIST OF FIGURES

Figure B-1.	Selected Duplicates: Gross Alpha.	B-2
Figure B-2.	Selected Duplicates: Aluminum.	B-2
Figure B-3.	Selected Duplicates: Arsenic.	B-3
Figure B-4.	Selected Duplicates: Barium.	B-3
Figure B-5.	Selected Duplicates: Beryllium.	B-4
Figure B-6.	Selected Duplicates: Gross Beta.	B-4
Figure B-7.	Selected Duplicates: Boron.	B-5
Figure B-8.	Selected Duplicates: Cadmium.	B-5
Figure B-9.	Selected Duplicates: Calcium.	B-6
Figure B-10.	Selected Duplicates: Chromium.	B-6
Figure B-11.	Selected Duplicates: Cobalt.	B-7
Figure B-12.	Selected Duplicates: Copper.	B-7
Figure B-13.	Selected Duplicates: Lead.	B-8
Figure B-14.	Selected Duplicates: Magnesium.	B-8
Figure B-15.	Selected Duplicates: Manganese.	B-9
Figure B-16.	Selected Duplicates: Molybdenum.	B-9
Figure B-17.	Selected Duplicates: Nickel.	B-10
Figure B-18.	Selected Duplicates: Potassium.	B-10
Figure B-19.	Selected Duplicates: Silicon.	B-11
Figure B-20.	Selected Duplicates: Sodium.	B-11
Figure B-21.	Selected Duplicates: ⁹⁰ Sr.	B-12
Figure B-22.	Selected Duplicates: Sulfate.	B-12
Figure B-23.	Selected Duplicates: Vanadium.	B-13
Figure B-24.	Selected Duplicates: Zinc.	B-13

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Introduction

Appendix B contains graphs of selected validated duplicate data. The graphs show how variability does/does not trend over the observed concentration range of the duplicate pairs. The ONLY points appearing on the graphs are those where each validated member of a data pair were reported at detectable levels. These are based on some of the data appearing in the Appendix A.

Each point on the graphs shows a standard deviation based on only two sample results. The reader is cautioned about making grand inferences from any particular point. Though inferences about a population variability based on only two samples are minimally precise, multiple estimates impart more confidence.

Most graphs display two sets of validated data--field duplicate/regular or split/regular sample pairs. The first is based on the results of field duplicates and their associated regular samples. These were collected concurrently and submitted to the primary laboratory without notification that they were duplicate samples. The first set demonstrates uncertainty in the media and a single laboratory measurement system.

The second set appearing on most graphs is based on the results of split samples and their associated regular samples. Split samples were submitted by Westinghouse Hanford to an alternate laboratory; associated regular samples were submitted to the primary laboratory. This set shows the wider validated data uncertainty associated the media and an independent laboratory estimate of the true average concentration at a particular location.

Figure B-1. Selected Duplicates: Gross Alpha.

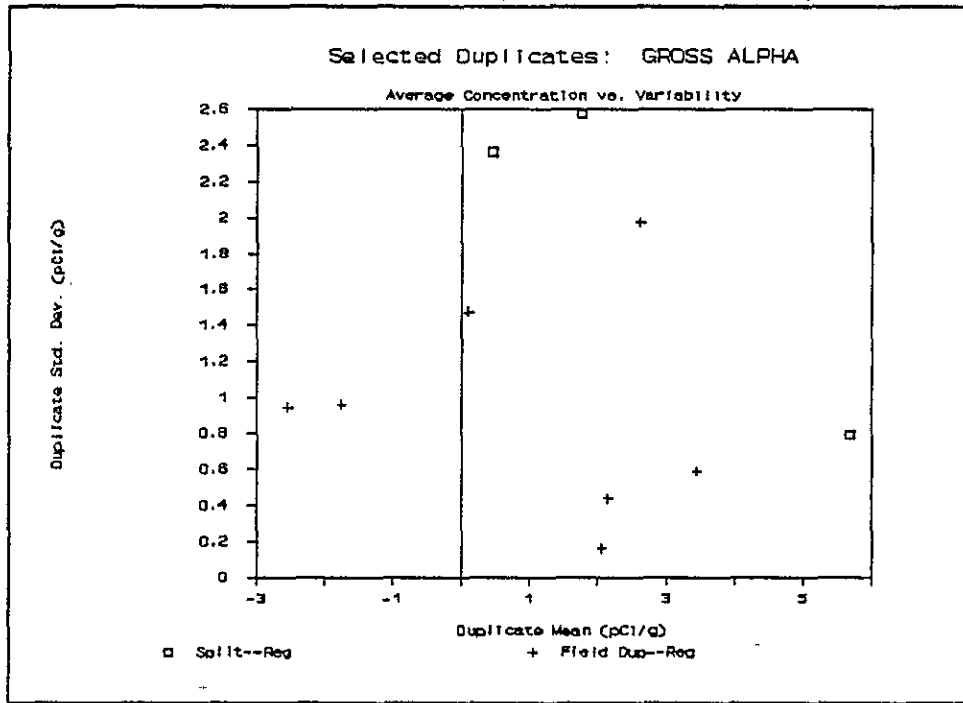
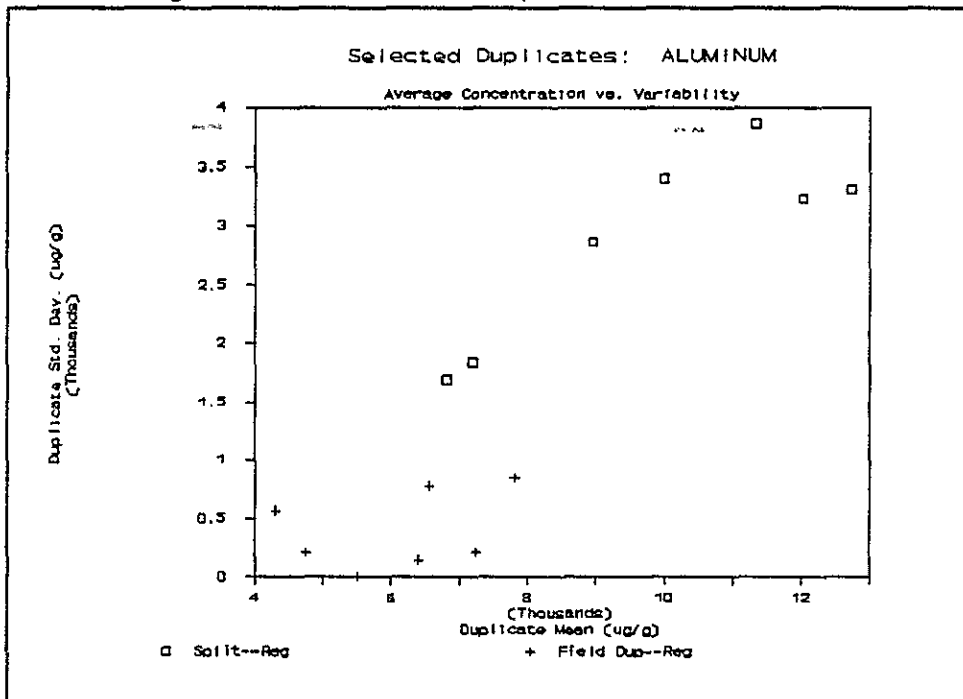


Figure B-2. Selected Duplicates: Aluminum.



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Figure B-3. Selected Duplicates: Arsenic.

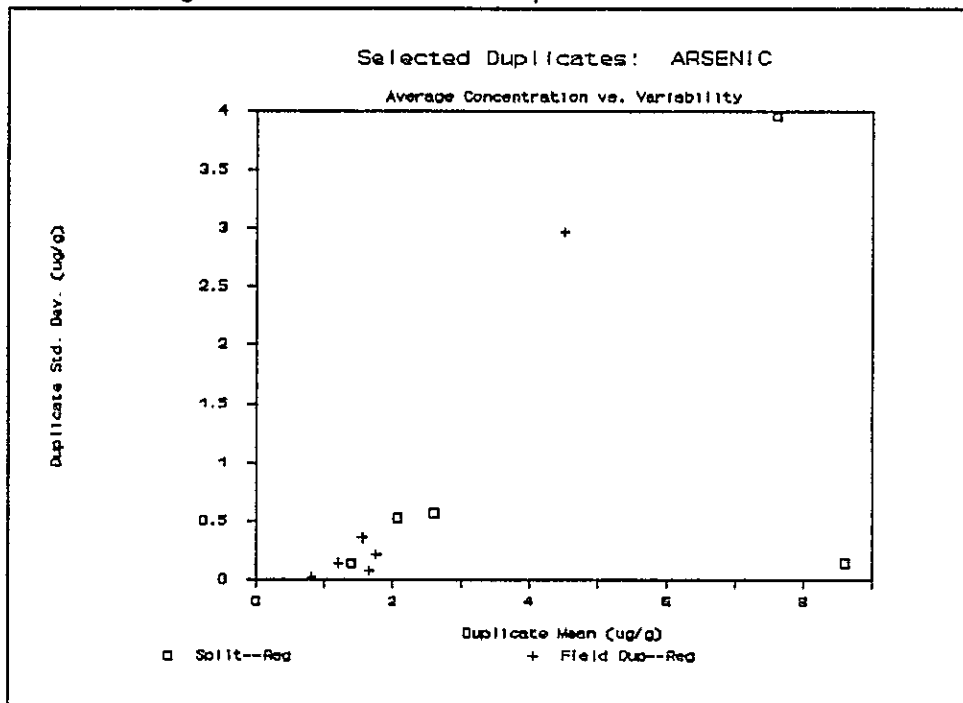
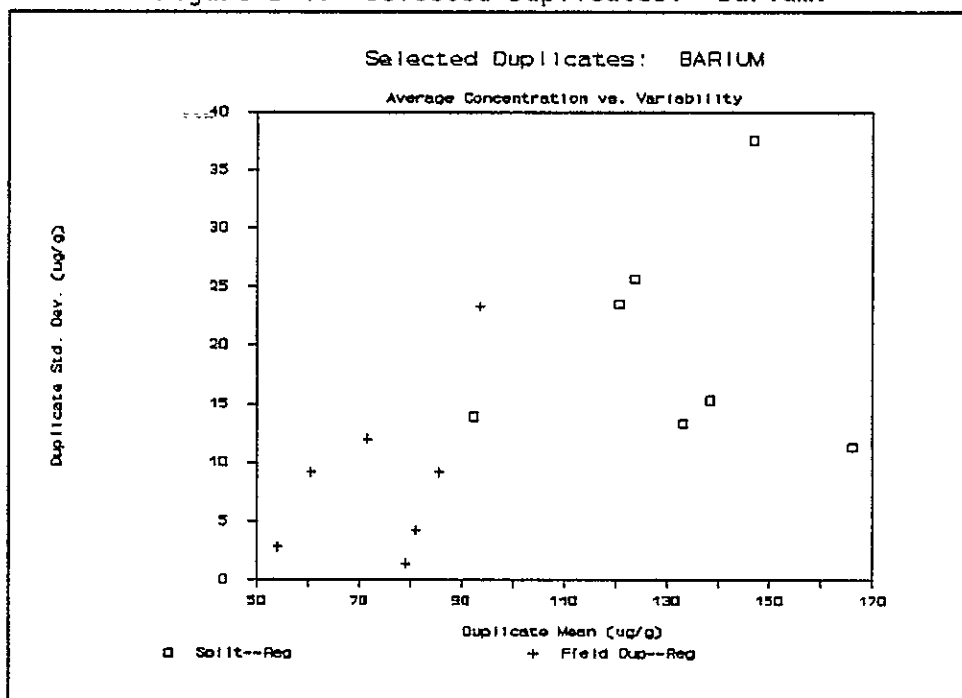


Figure B-4. Selected Duplicates: Barium.



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Figure B-5. Selected Duplicates: Beryllium.

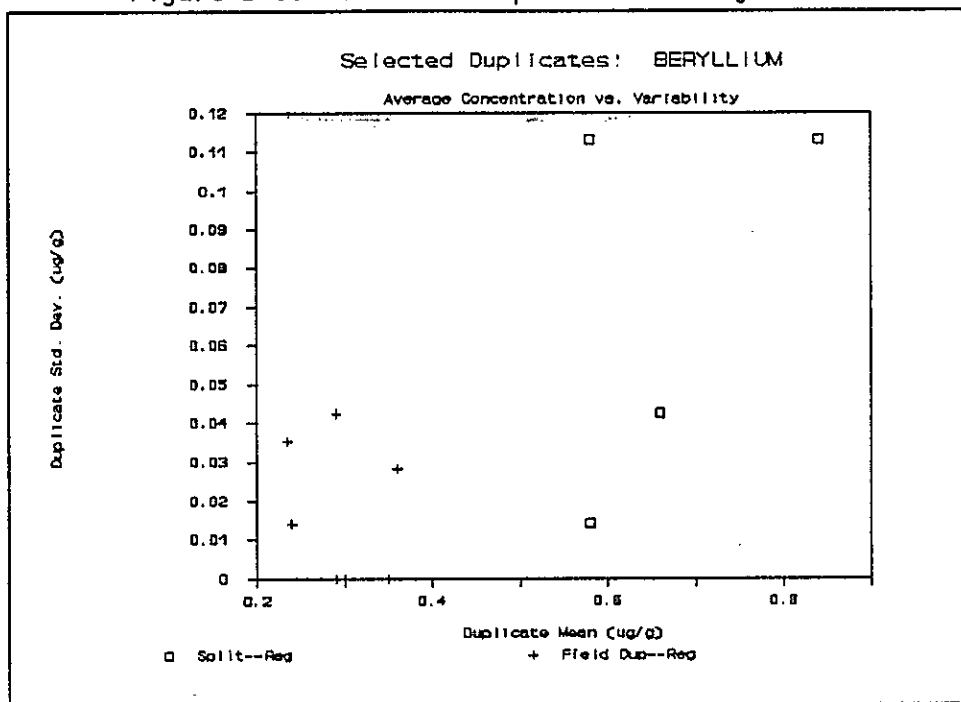
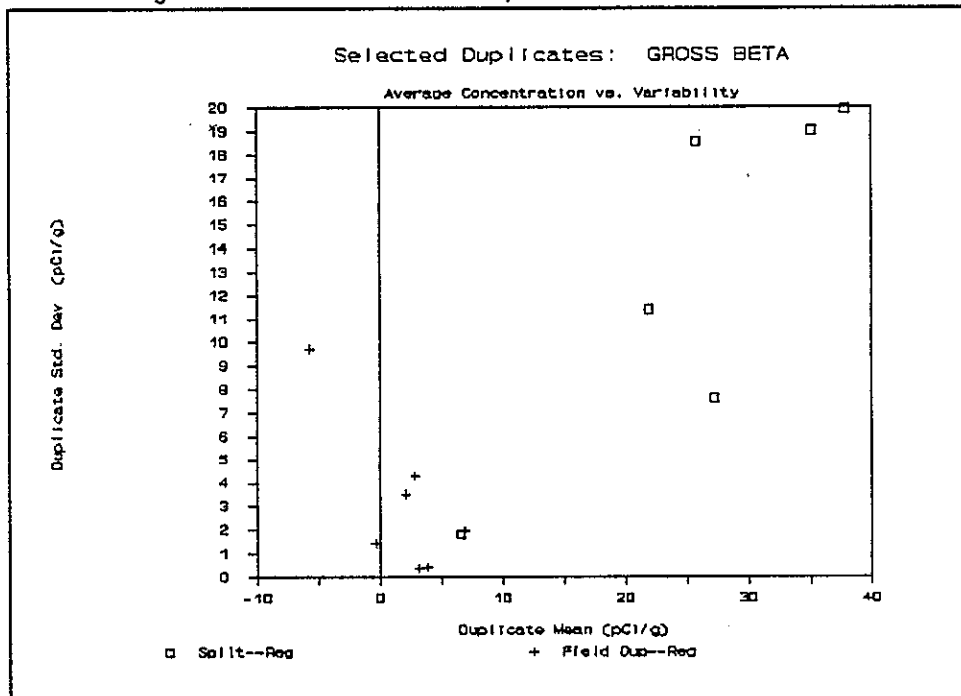


Figure B-6. Selected Duplicates: Gross Beta.



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Figure B-7. Selected Duplicates: Boron.

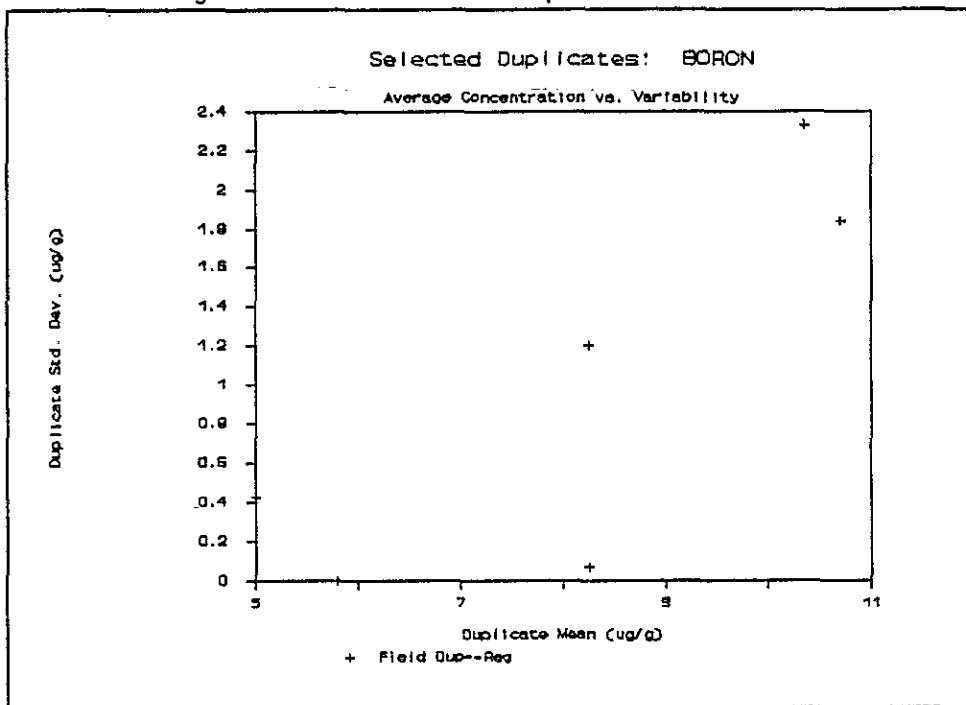
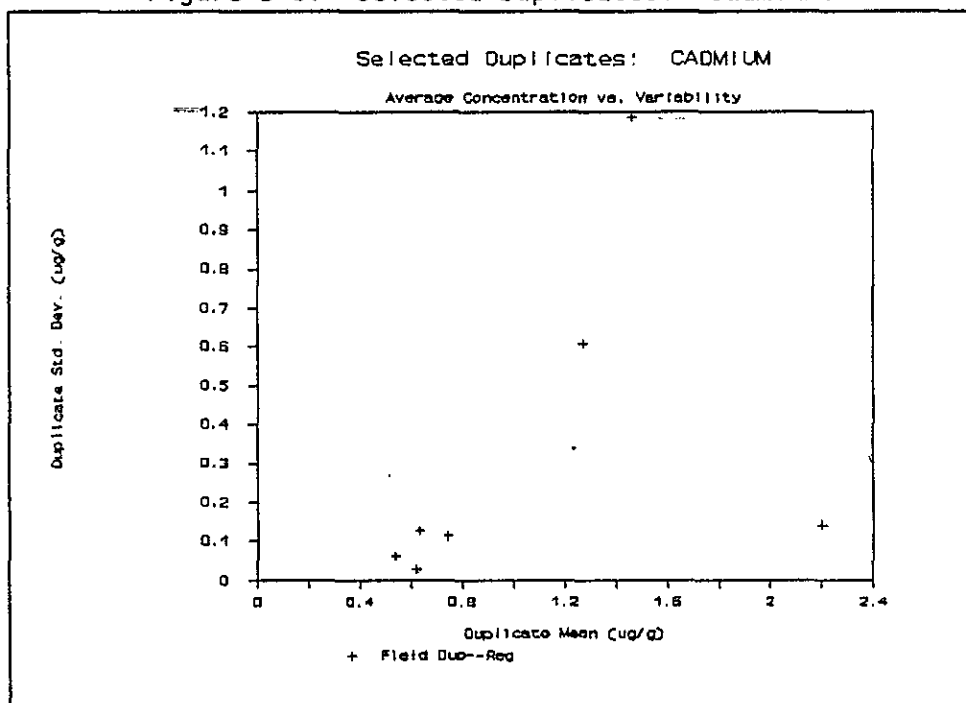


Figure B-8. Selected Duplicates: Cadmium.



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Figure B-9. Selected Duplicates: Calcium.

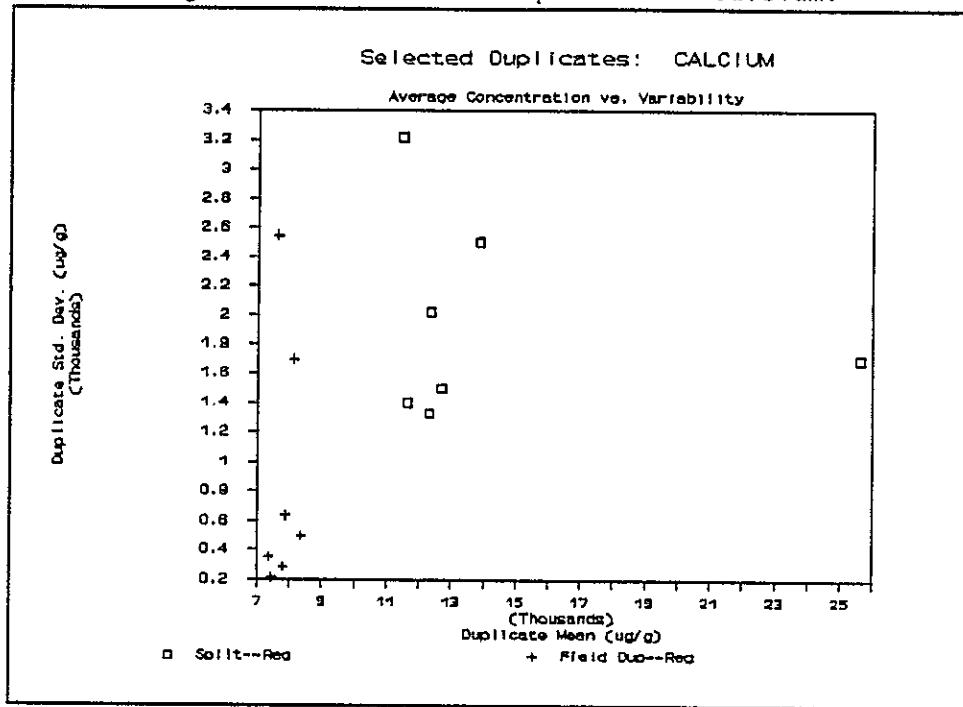
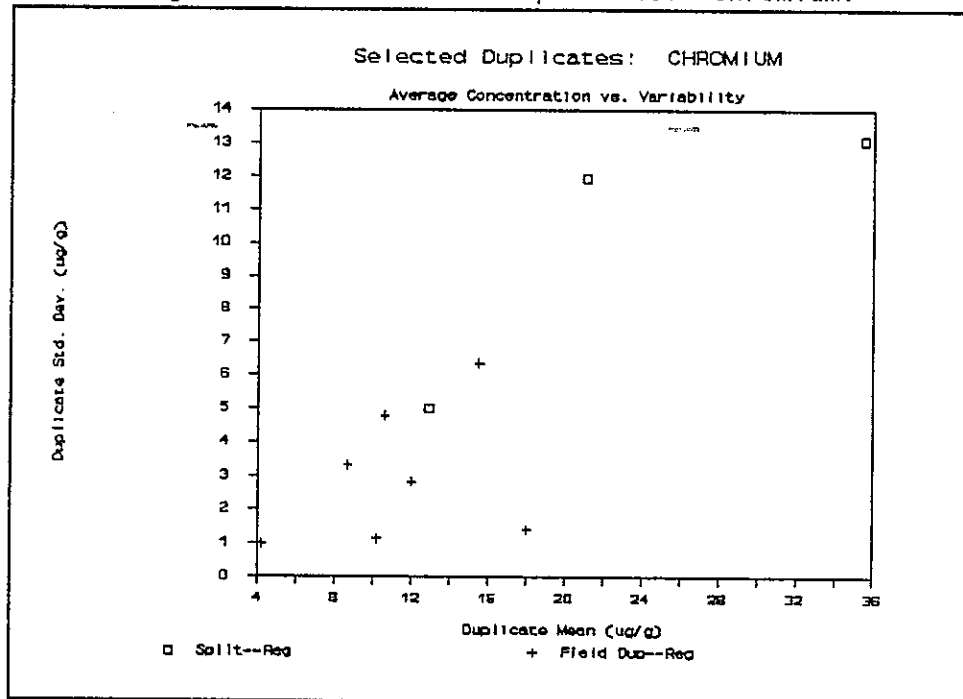


Figure B-10. Selected Duplicates: Chromium.



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Figure B-11. Selected Duplicates: Cobalt.

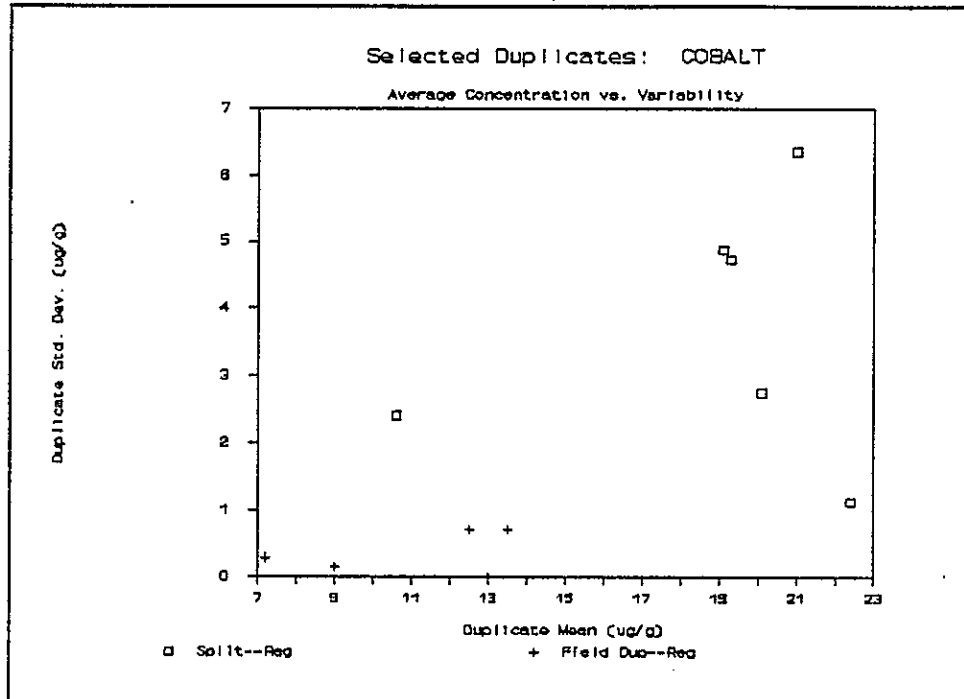
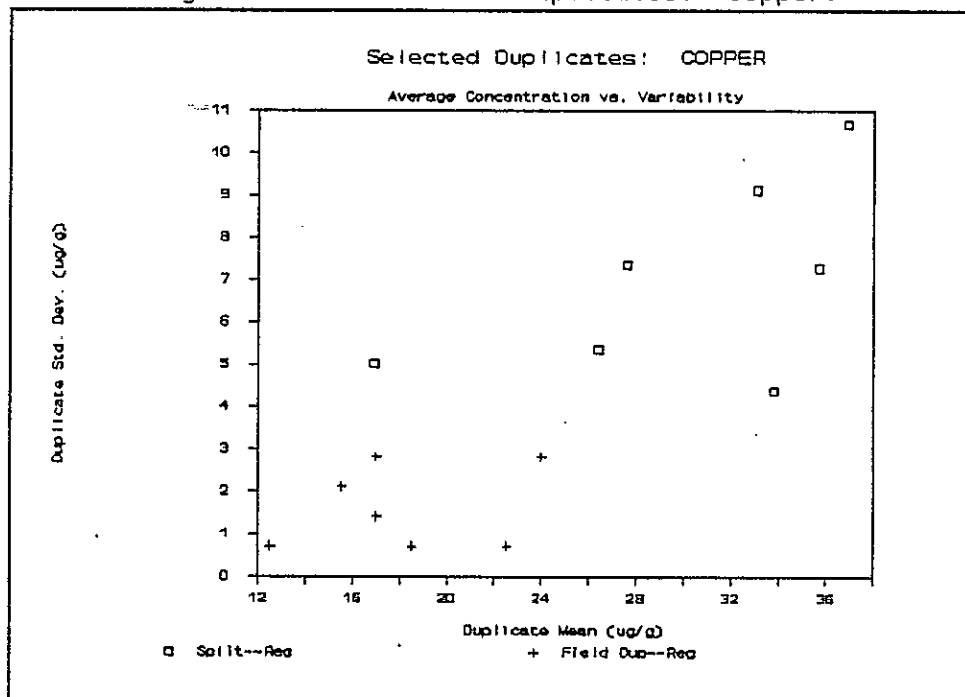


Figure B-12. Selected Duplicates: Copper.



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Figure B-13. Selected Duplicates: Lead.

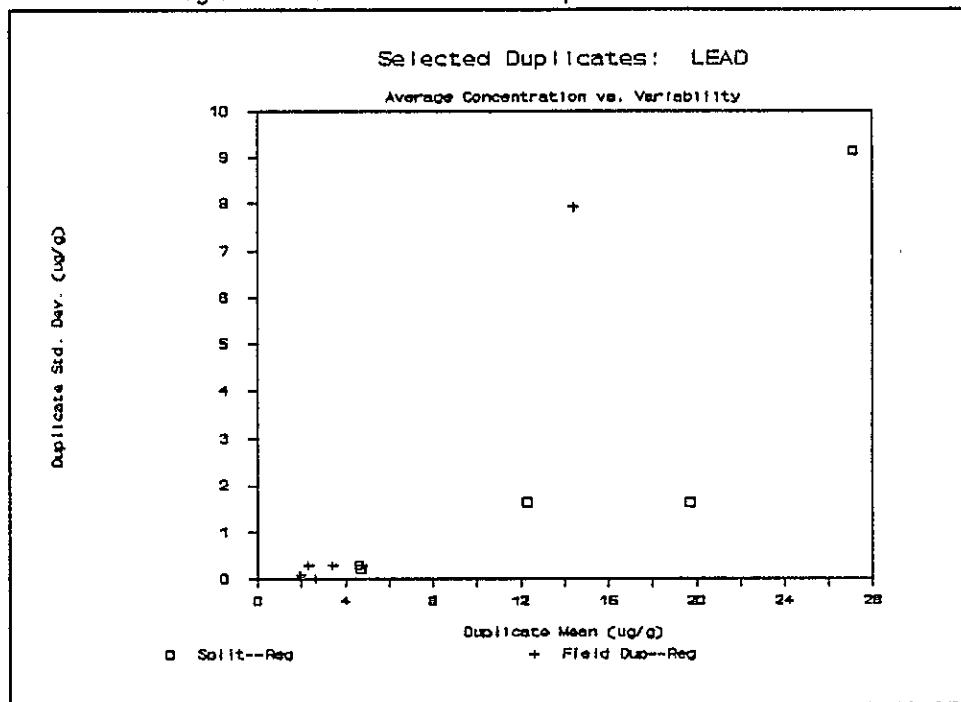


Figure B-14. Selected Duplicates: Magnesium.

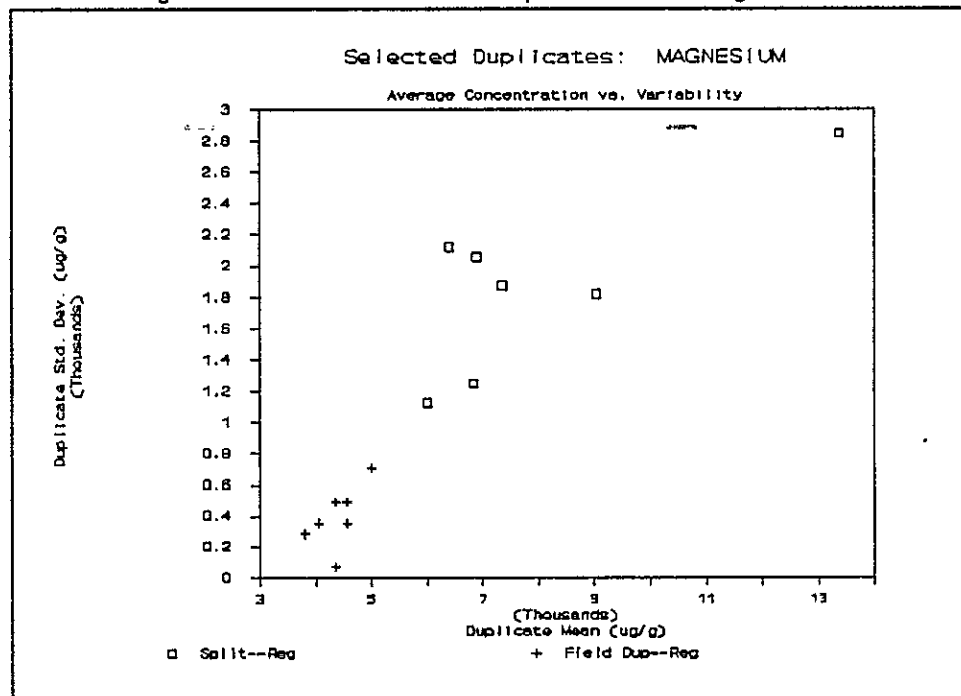


Figure B-15. Selected Duplicates: Manganese.

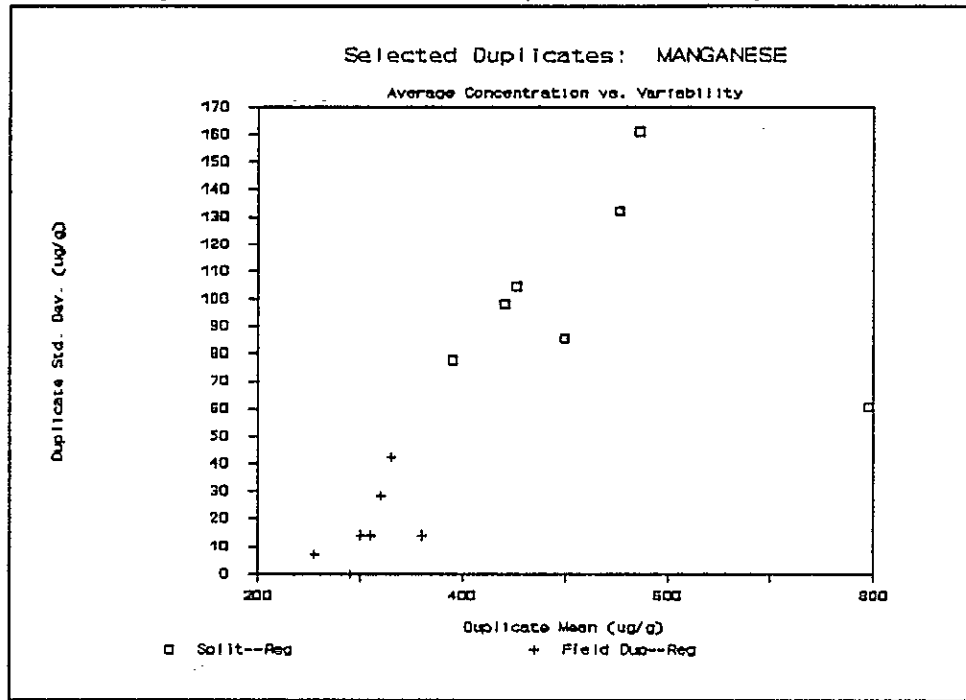
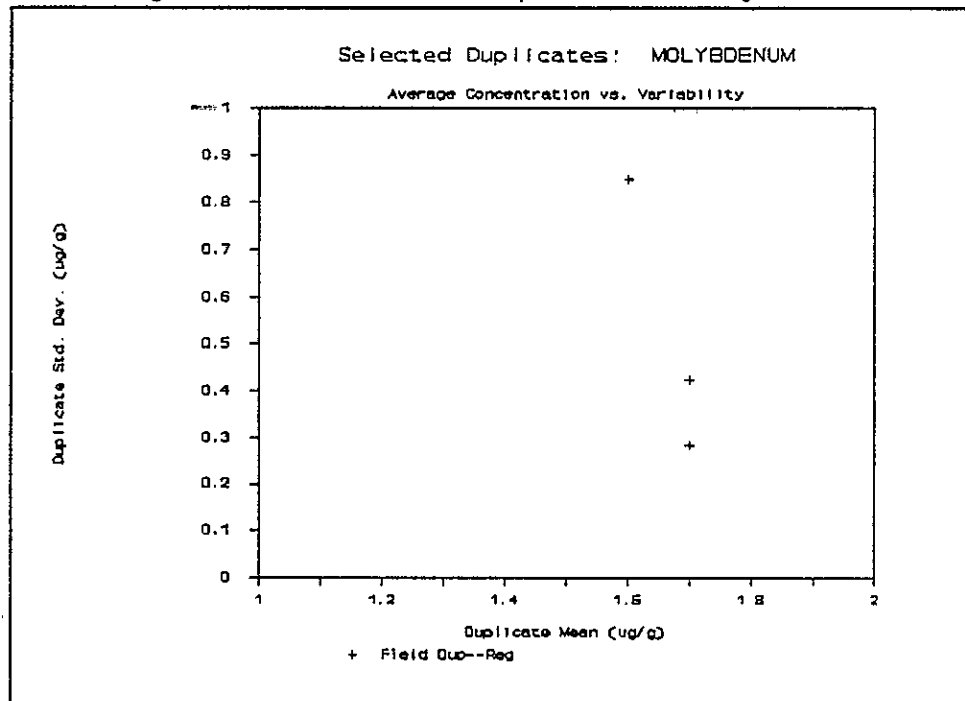


Figure B-16. Selected Duplicates: Molybdenum.



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Figure B-17. Selected Duplicates: Nickel.

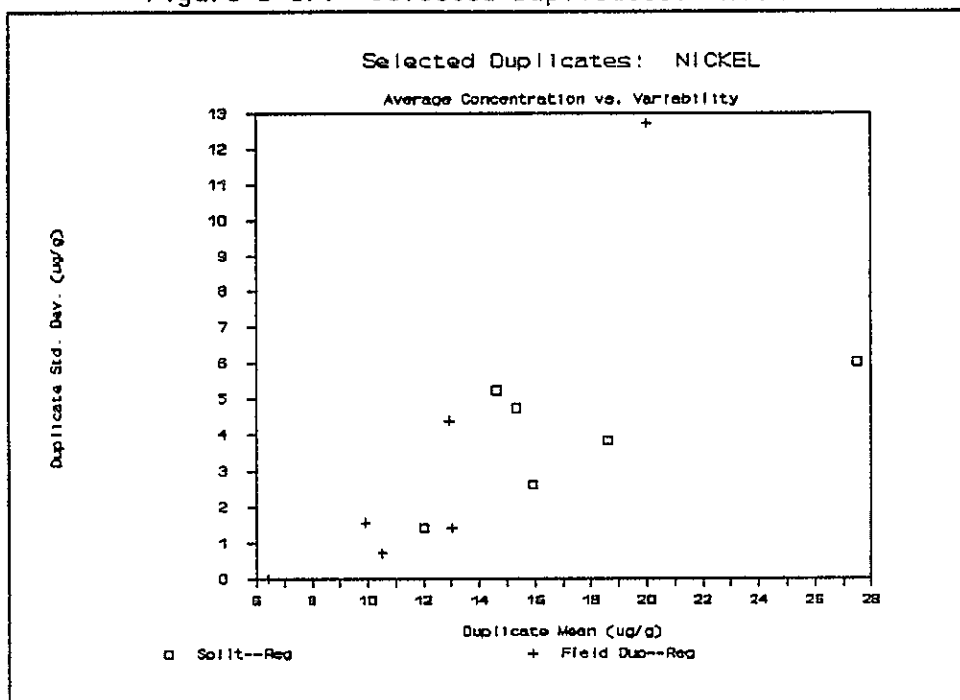
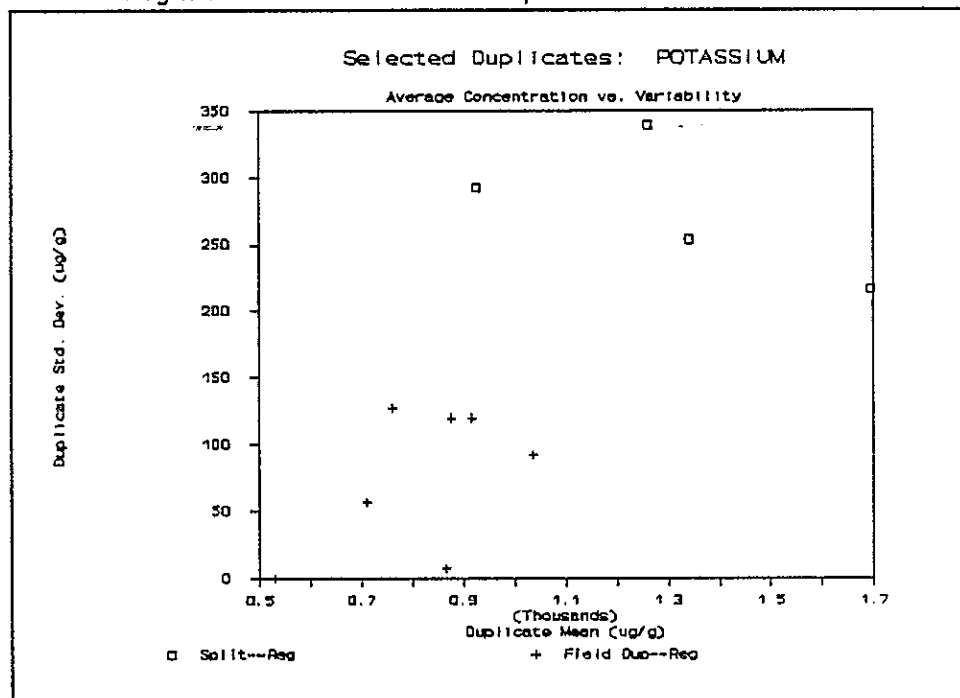


Figure B-18. Selected Duplicates: Potassium.



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Figure B-19. Selected Duplicates: Silicon.

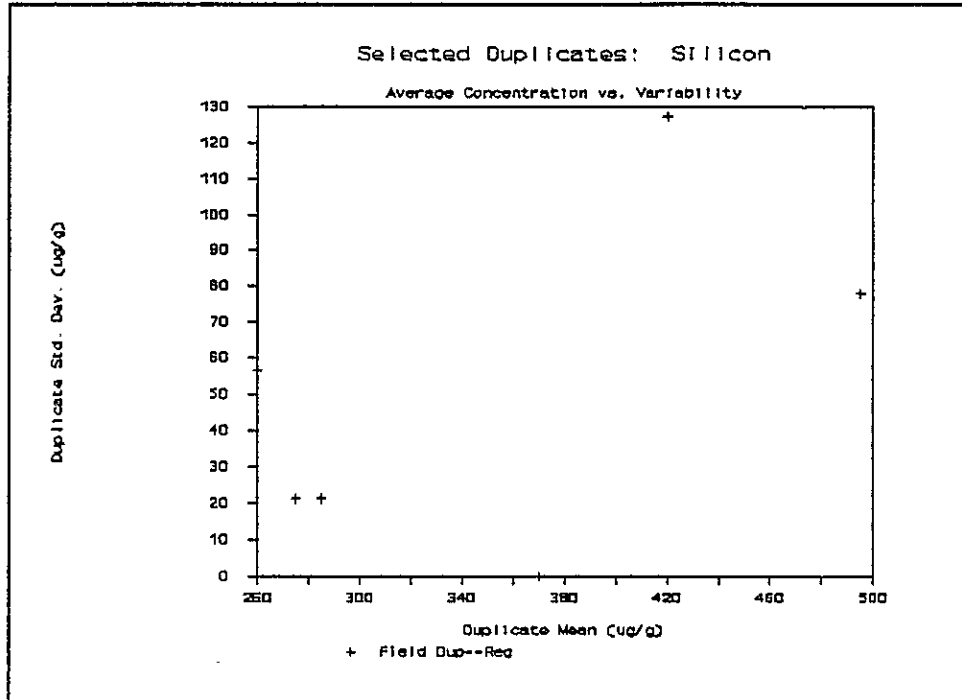
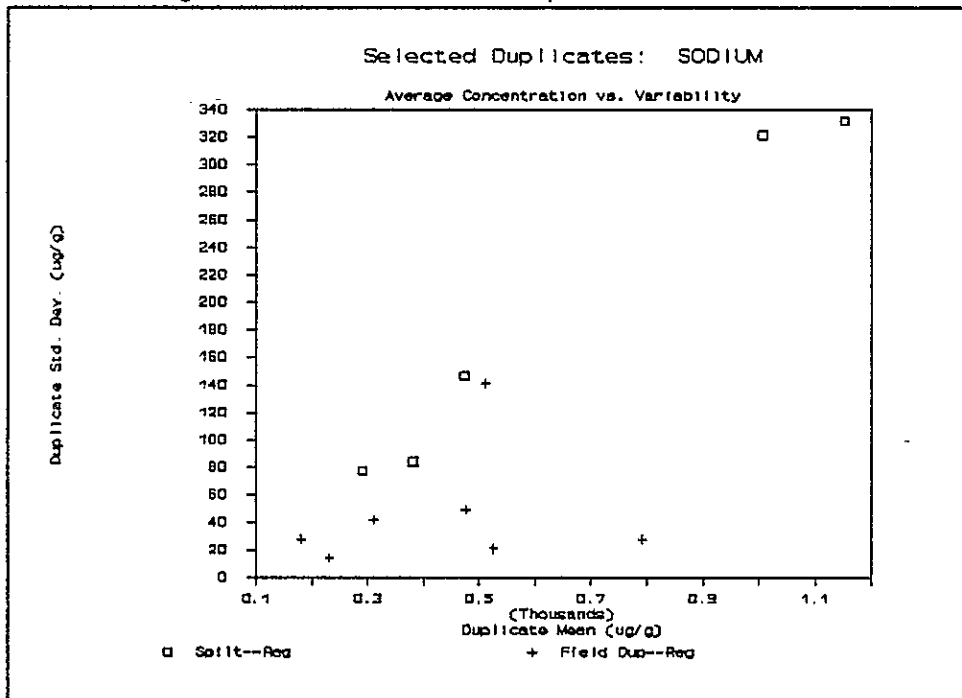


Figure B-20. Selected Duplicates: Sodium.



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Figure B-21. Selected Duplicates: ^{90}Sr .

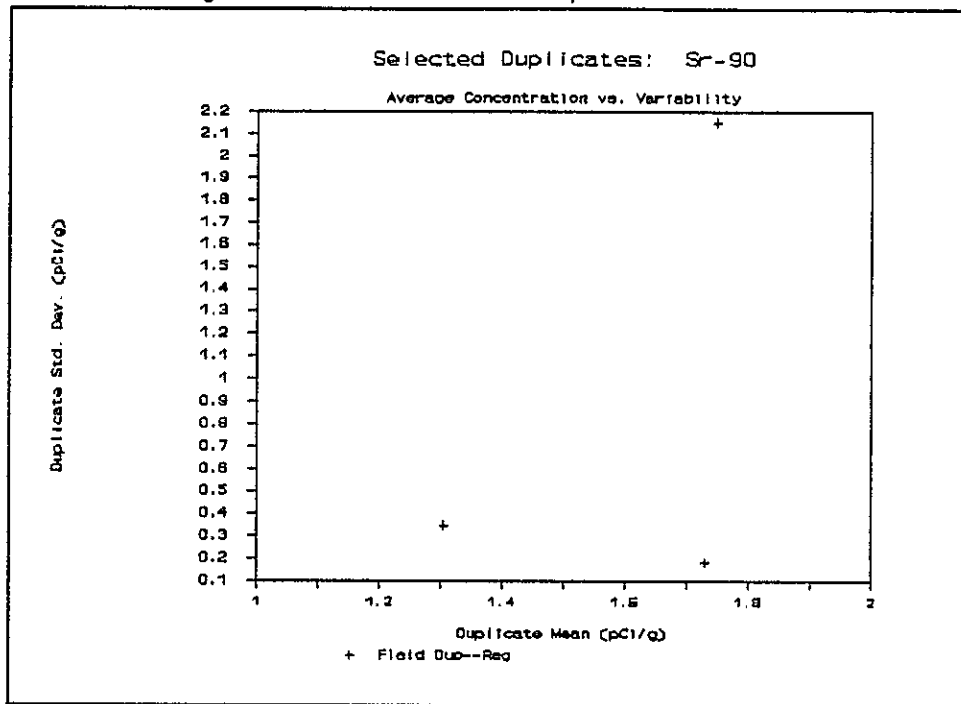
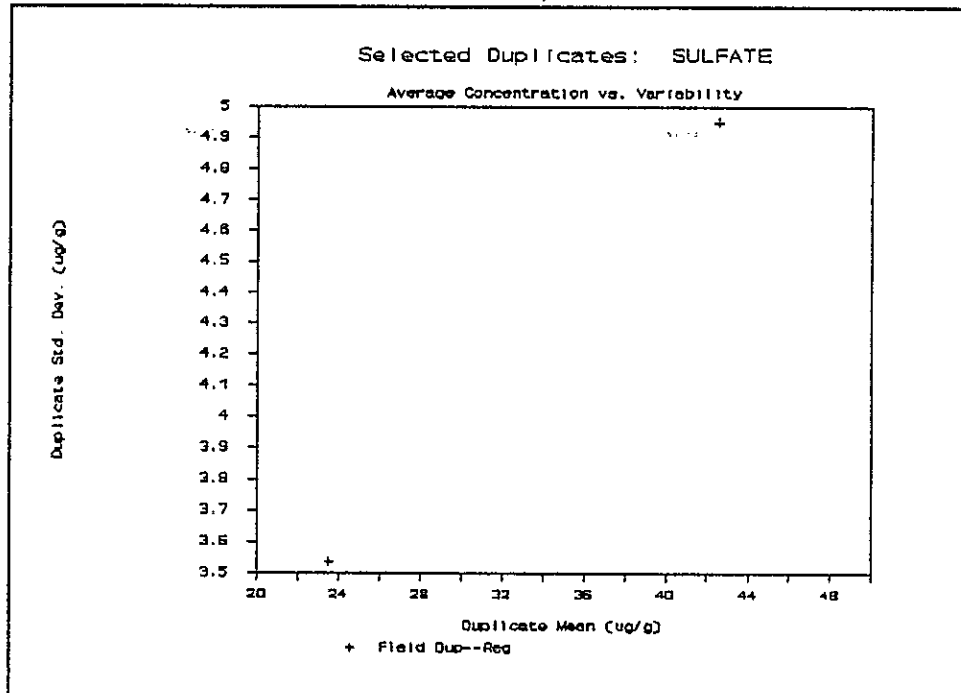


Figure B-22. Selected Duplicates: Sulfate.



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Figure B-23. Selected Duplicates: Vanadium.

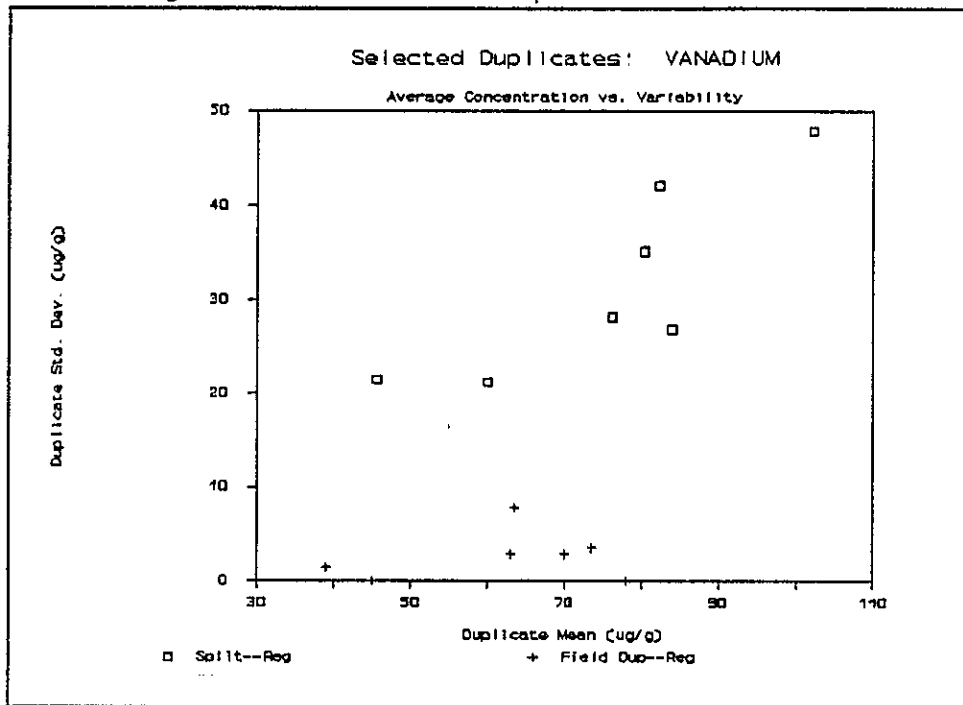
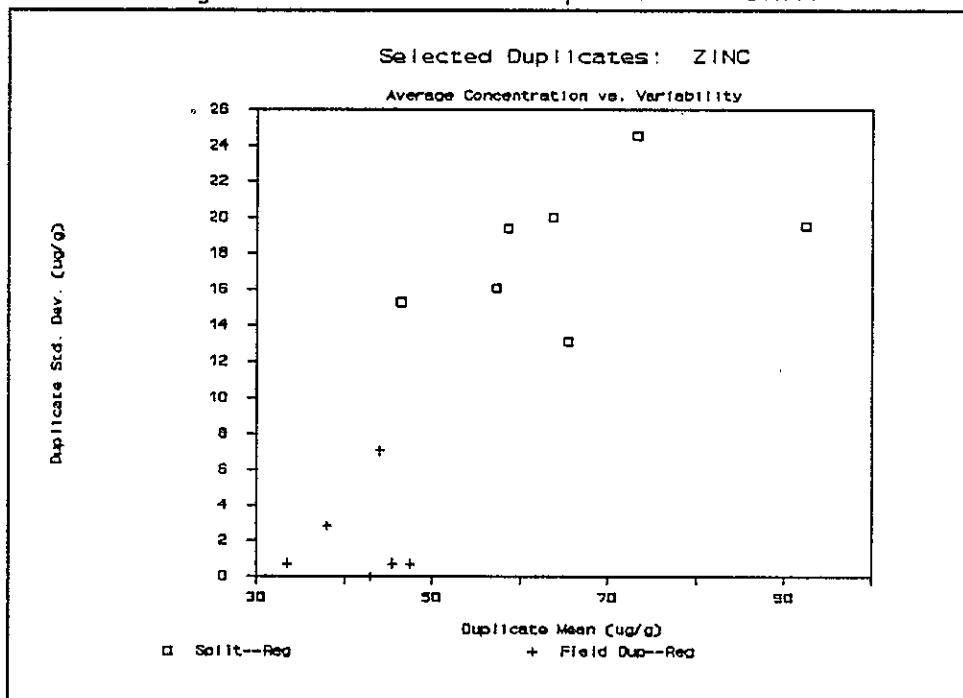


Figure B-24. Selected Duplicates: Zinc.



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APPENDIX C

ENVIRONMENTAL PROTECTION AGENCY OFFICE OF SOLID WASTE
AND EMERGENCY RESPONSE MEMORANDUM

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 19 1989

SOLID WASTE AND EMERGENCY RESPONSE

Mr. Thomas C. Jorling
Commissioner
Department of Environmental Conservation
State of New York
Albany, New York 12233-1010

Dear Mr. Jorling:

I am writing in response to your letter of May 5, 1989, in which you ask numerous questions concerning the regulatory status, under the Resource Conservation and Recovery Act (RCRA), of environmental media (ground water, soil, and sediment) contaminated with RCRA-listed hazardous waste.

As you point out in your letter, it is correct that the Agency's "contained-in" interpretation is that contaminated environmental media must be managed as if they were hazardous wastes until they no longer contain the listed waste, or are delisted. This leads to the critical question of when an environmental medium contaminated by listed hazardous waste ceases to be a listed hazardous waste. In your letter, you discuss three possible answers (based on previous EPA positions and documents) which you believe address this question, and request the Agency to clarify its interpretation. Each of these is discussed below.

The first possible answer you cite would be that the contaminated media would be a hazardous waste unless and until it is delisted, based on the "mixture" and "derived-from" rules. As you correctly state in your letter, a waste that meets a listing description due to the application of either of these rules remains a listed hazardous waste until it is delisted. However, these two rules do not pertain to contaminated environmental media. Under our regulations, contaminated media are not considered solid wastes in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations. Therefore, contaminated environmental media cannot be considered a hazardous waste via the "mixture" rule (i.e., to have a hazardous waste mixture, a hazardous waste must be mixed with a solid waste per 40 CFR 261.3(a)(2)(iv)). Similarly, the "derived-from" rule does not apply to contaminated media. Our basis for stating that contaminated environmental media must be managed as hazardous wastes is that they "contain"

-2-

listed hazardous waste. These environmental media must be managed as hazardous waste because, and only as long as, they "contain" a listed hazardous waste, (i.e., until decontaminated).

The second possibility you mention is that environmental media contaminated with a RCRA listed waste no longer have to be managed as a hazardous waste if the hazardous constituents are completely removed by treatment. This is consistent with the Agency's "contained-in" interpretation and represents the Agency's current policy.

The third possibility you discuss comes from Sylvia Lowrance's January 24, 1989, memorandum that you cited in your letter. This memorandum indicates that OSW has not issued any definitive guidance as to when, or at what levels, environmental media contaminated with listed hazardous waste are no longer considered to contain that hazardous waste. It also states that until such definitive guidance is issued, the Regions may determine these levels on a case-specific basis. Where this determination involves an authorized State, such as New York, our policy is that the State may also make such a determination.

Related to such a determination, you ask whether a risk assessment approach that addressed the public health and environmental impacts of hazardous constituents remaining in treatment residuals would be acceptable. This approach would be acceptable for contaminated media provided you assumed a direct exposure scenario, but would not be acceptable for "derived-from" wastes under our current rules. Additionally, consistent with the statute, you could substitute more stringent standards or criteria for contaminated environmental media than those recommended by the Federal EPA if you determined it to be appropriate.

The Agency is currently involved in a rulemaking effort directed at setting de minimis levels for hazardous constituents below which eligible listed wastes, treatment residuals from those wastes, and environmental media contaminated with those listed wastes would no longer have to be managed as hazardous wastes. The approach being contemplated in the De Minimis program would be similar to that used in the proposed RCRA Clean Closure Guidance in terms of the exposure scenario (direct ingestion), the management scenario (not in a waste management unit), and the levels (primarily health-based).

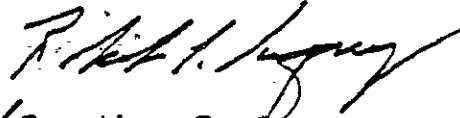
Your final question related to whether the "remove and decontaminate" procedure set forth in the March 19, 1987 Federal Register preamble to the conforming regulations on closing surface impoundments applies when making complete removal determinations for soil. These procedures do apply when one

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chooses to clean close a hazardous waste surface impoundment by removing the waste. The preamble language states that the Agency interprets the term "remove" and "decontaminate" to mean removal of all wastes, liners, and/or leachate (including ground water) that pose a substantial present or potential threat to human health or the environment (52 FR 8706). Further discussion of these requirements is provided in a clarification notice published on March 28, 1988, (53 FR 1144) and in OSWER Policy Directive # 9476.00-18 on demonstrating equivalence of Part 265 clean closure with Part 264 requirements (copy enclosed).

I hope that this response will be helpful to you in establishing and implementing New York's hazardous waste policies on related issues. Should you have additional questions, please contact Bob Dellinger, Chief of the Waste Characterization Branch at (202) 475-8551.

Sincerely yours,



Jonathan Z. Cannon
Acting Assistant Administrator

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